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MODEL AIRPLANE NEWS

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PLM-45

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INTERNATIONAL COMPETITION NEWS

► By the time you read this, the final selections for the U.S. Nordic Glider A/2 team will have been made. Four central semi-final sites were selected throughout the country. These were located at Marysville, Calif.; Wichita, Kan.; Fredericks, Md.; and Bloomington, Ind. The round system was used at the semi-finals held June 16th. Competing entrants were the top 20% of the glider local eliminations throughout the country or any persons who accumulated a total time of 11 minutes. A complete report on the team members will be made later in this column.

The following is the 1958 local elimination procedure for selection of U.S.A., Wakefield and Power teams. As we have pointed out in previous issues, the selections for 1958 teams will be made this year, on August 24-25. (Authority—AMA International Competition Committee, Peter J. Sotich, Chairman.)

RULES

The new rules as listed in last month's column will apply. These rules allow only 50 grams of rubber for Wakefield models. Power model loadings are 300 grams per centimeter (173.5 ounces per cubic inch). All models will be hand launched. The F.A.I. rules for these events as listed in the 1957-1958 Rule Book *are not* the rules which the 1958 eliminations will be flown.

ENTRIES

All eliminations are AMA sanctioned. Only holders of 1957 model flier's licenses may compete. A contestant will be allowed to compete in only one local elimination. A completed entry from (if provided by the Contest Director) or a notice of intention to compete (letter or card) must be sent to the Contest Director on or before August 21st. Late entries will be accepted upon payment of $1.00 fine. The entry fee must be paid to the Contest Director prior to the starting time or each event entered. No flying will be permitted by unentered persons.

ENTRY FEES

	One Event	Two Events
Junior	$ .50	$ .75
Senior	1.00	2.00
Open	2.00	3.00

CONTEST TIME

August 24-25 are the dates. The local Contest Directors will decide which day each event will be flown. One event only will be held each day and must be completed on that day. Example: If Wakefield should be flown on Saturday in your area, all five flights must be completed on Saturday. No starting time is set by the ICC. This will be left to the Contest Directors as they are more familiar with the local conditions. One and one-half hours per flight will be allowed, making a total time of 7½ hours for each event.

(*Continued on page* 36)

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29th Year of Publication

MODEL AIRPLANE NEWS

JAY P. CLEVELAND, President and Publisher

AUGUST 1957 Vol. LVII, No. 2

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by William Winter

► In the May issue of MAN, John Zawiski of the Hawk Model Co., one-time manufacturer of solid models and, in more recent years, a major producer of plastic kits, made history by agreeing with MAN at Work that the manufacturers were forgetting the kids who wanted to "fly" something. As the lawyers begin, "Comes now" a chap, Bill Greenwood (complete address, April 6, 1957—and that is par for the course) who disagrees with Zawiski's argument that new ideas for, and methods of making, flying plastic models, answers the original complaint. And that was simply that you also have to glue sticks to call it model building.

Let's get it straight. No one is agin plastics. Plastic models are here to stay, like jelly beans and morning coffee. But lotsa people are against the concept of modeling if it is all plastics and no build-and-fly. Anyway, the plastic business is so big (Revell did $10,000,000 last year, 'tis said) that the boys no doubt can survive the modelers' laments.

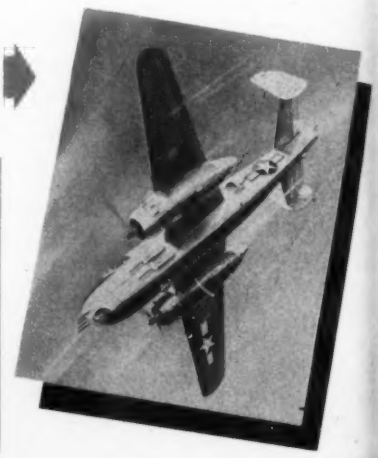
"I was bothered by Mr. Zawiski's remarks because I have been a modeler for 13 years," states Greenwood, "and, during that time, I have interested many people in model building. Most of them agree that plastic models do not represent progress and, as far as teaching anything, they represent only the most primitive stages of constructional instruction.

"Plastic planes do not represent progress." Bill claims. "There have been ready-built 'toys' on the market since I can remember, which would do anything from climb ladders to deep-sea diving. They involve no creative ability. They were created solely by the manufacturer.

"Plastic models may be what people want but in no way do they express creative ability among people who want to express themselves through the skills of model building.

"I agree with Zawiski that new materials should be used," he continues. Modelers are aware of this, as evidenced by Fibreglas and Styrofoam, etc. There always will be plenty of creative individuals who want to build their own planes, boats, cars, or anything else, and who do not enjoy reassembling what some manufacturer has disassembled to fit into a box. Plastic kits, as they appear now, in no way compete with any of their balsa counterparts (what balsa counterparts? —editor) (*Continued on page 7*)

NEXT MONTH'S COVER
North American B-25H



PLANE ON THE COVER

Mighty big gun in the Allied air arsenal in World War 2 was the Republic Thunderbolt, the P-47D being shown. Affectionately called the "Jug," the 47 was big, powerful, robust slugger. Like Republic fighters always, it was tops as fighter-bomber combo. Carried two 1,000 pounders, one 500 pounder. Over 2,000 hp (P&W), hit middle 400's without strain.

MAN at Work

(*Continued from page 4*)

which were designed on more of a contest level."

But it seems to us, that plastic model makers have done nothing wrong, unless you call wrong, giving people what they want. Besides, we think kids get fun out of putting together plastic kits; they buy the kits because they can successfully complete an airplane. The real failure lies in the lack of industrial achievement with wood-and-cement, built-up models—when major manufacturers desert balsa, and their expensive wood cutting plant gathers dust, while they grind out plastics by the millions, that failure is there for all to see, and includes everyone of us who is part of that failure. Not every kid who assembles a plastic model will make a real modeler. We suspect that most of them never will. Kids have many other activities, too. But many are interested in progressing further into the hobby. The six-lane plastic highway ends abruptly at the edge of a green pasture. There are signs of life at last in the ranks of the "old fashioned" manufacturers.

Some mighty good people have tried and will keep on trying to fill the need for built-ups. That big wintertime Cleveland prefab event shows what kids can do with little fliers. The thing has never caught fire with the manufacturer, jobber, and dealers on a broad front, so evidently the answer is yet to be found.

If plastics, either scale or flying models, are most popular today, it is because they are better than anything else. That is the truth. Also a challenge.

• • •

► Reported in Radio Control News this month is the AMA petition to FCC for relief from the growing interference problem on 27.225. Meanwhile, the case of the Blinking Traffic Lights is no nearer solution. There are some fascinating clues. For instance, the City of Los Angeles did not know that model builders were on the same frequency. That city petitioned FCC for a different frequency, once the interference problem was known. General Electric, who makes the equipment, did not even know (so they stated recently) that Los Angeles had this interference problem. Further, GE had made the equipment tunable and there is no problem as far as they are concerned of getting off "our" frequency except, and this is an upper case except, that FCC holds them there. GE doesn't like the "garbage band" either, as 27.255 is known to be. It appears that everybody is in the dark—let's hope these guys get introduced.

• • •

► A man, too, has the privilege of changing his mind. MAN at Work herewith ceases lambasting FAI (until the next foul-up on rules). In this issue, Lee Renaud, writing for the New England Group, one of the stalwart supporters of international flying for American modelers, analyzes the new rules and suggests airplane specifications for both Wakefield and Power. He is constructive and this, we think, is fitting and proper.

Hold no sympathy for modelers who groan that special ships are needed, that you can't build for multiple events. By this they mean the FAI finals, the Nationals, and the local meet in Bailey's Switch. Why should not special ships be needed? What comes before the international authority, or world opinion? Let's put up or shut up.

As an old free flighter (oh, the names we shall be called) we like the notion that FAI power, by limiting performance, will compel adding D, E, and F to the A, B and C's, in cooking up designs. If the same thing happened in U. S. free flight, it could be that the modeling public would want to make the same airplanes as the contest guys build. It might even interest the kit makers. Maybe free flight would mean something to all of us. Numerous fliers will disagree violently with us. They may be right. This is only one opinion.

So they took away some of the rubber for Wakefield. Apparently, if Renaud is correct, you can still make three minutes. If the principle of limiting motor run in free flight (under any rules) is correct, why should it not hold true for rubber, also, provided there is a field problem or because, too, many people end up in a tie. Less rubber is tantamount to cutting motor run.

• • •

► But complex rules waste everybody's time. The sheer pressure of numbers and the threatened collapse of free flight events after the war due to idiotic processing delays led to a simplification of free flight rules in this country. The decade of rules stability that followed should prove something or other. Wing loading rules never missed. Nor the cross section rule. Only a power loading rule remains, and this appears an effective governor, with respect to influence on design. The consideration of combined stab and wing areas in FAI, and the odd sounding fractional figures that result, probably accomplish nothing. As long as international processing is not subject to 400 irate guys waiting in line, a wing loading rule apparently can still be tolerated.

It baffles this simple mind why, say, a .15 motor with an appropriate minimum power loading should not be all the basic design rules anyone requires. Build the crate flimsy and the wind washes you out. Build it heavy and you can't glide worth a hoot. Design levels itself. Will a big ship result? Son, they are big. Now.

The take-off requirement gradually has proved too much of a design problem for the geniuses to solve. Resourceful solution, this. If you can't lick it, abolish it. If the you-pushed-no-I-didn't argument caused the rules change, it would have been better to let the men push on take-off. Whoever thought up the Wakefield take-off rules should have had his head examined—and why wasn't that stupid rule changed years ago? How was this rule so sacred when the "wheels" upped and changed the event so much, so many times, that builders have been going in circles ever since. Stringent rules and loadings bring everyone to competing within the confines of a dime-space—open it up and let the initiative and flair and imagination of many lands run rampant. Let's see some progress instead of stuffy arguments. Why should all crates have to look alike? Must the solution be stereotyped? To be practical, we hope the FAI rules stay put.

• • •

► El Cajon, San Diego, Calif., sounds like heaven on earth. On an eight-acre field the El Cajon Modelers Association have four grass circles, one team and speed circle. The four circles are for stunt, combat, rat racing, and Half-A speed. Picnic areas, bleachers, judges stands, roomy pit areas. The circles are terraced and have cement runways and

(*Continued on page 36*)

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For that new 1957 pattern, why not build and fly a real airplane. This .35-powered big wing won two firsts in its first two meets.

Exciting, eh! Thicker tip sections, equivalent to washout, eliminate roll-in tendencies. Nose tends to drop, instead, on any careless stalls. FA comes in slowly, runs one foot on concrete.

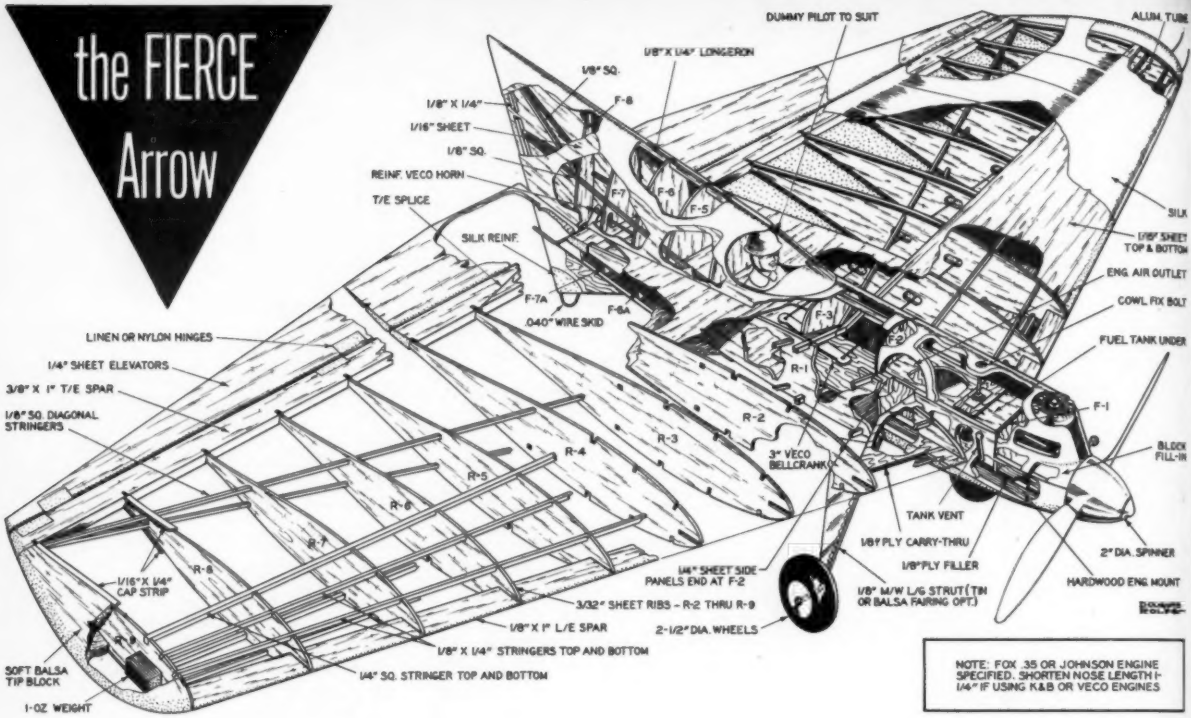
► The Fierce Arrow was conceived mainly to be different. Design analysis indicated possibilities of superior performance, in that high Reynolds Number (740,000) allowed a CL max of 1.3 or almost as good as flaps. Wing loading is actually less than the Half Fast or 7.63 oz. a square foot. Drag was the only thing that had us worried, but it has proved to be no more than a conventional 500 sq. in. job.

We see no reason for the flying wing to be maligned the way it is, except that its detractors have not achieved the proper balance. Also, the Half Fast and Arrow have a thicker tip than root (16% to 12%) giving the same stable stall characteristics as washout on conventional wings. Hence, no roll-in from stalled conditions, and a nose dropping affect to pull out of said stall. Tug is achieved from yaw which also removes the necessity of shortening the outboard panel. The outboard wing has more sweepback, hence is less effective —therefore, no engine offset. Area is 810 sq. inches while speed hovers between 60 and 65 MPH, weight around 3 lbs. Tug is generous, particularly overhead. The proof of the pudding is the way it eats up the pattern.

All the superlatives have been used up describing stunt ships, leaving little room for describing flight characteristics, which are superior. Suffice it to say, that out of two meets it has won two firsts, one of them at the King Orange meet on its 6th flight. Six of them have been built and more are in progress. By the way, that's a "35" in there!!

We calculated the minimum turn radius at 10.2 feet, and the large area lets it go around square turns clean with no tendency to bobble. Nose-heavy trim brings it out clean and there's always a margin of safety on

the FIERCE Arrow



eights. Overheads, where it's up to the ship, are easy. Also, landing and take-off are automatically maximum points if you do not fight the ship. It flies slow enough that landing run is about one foot on concrete. Interested yet?

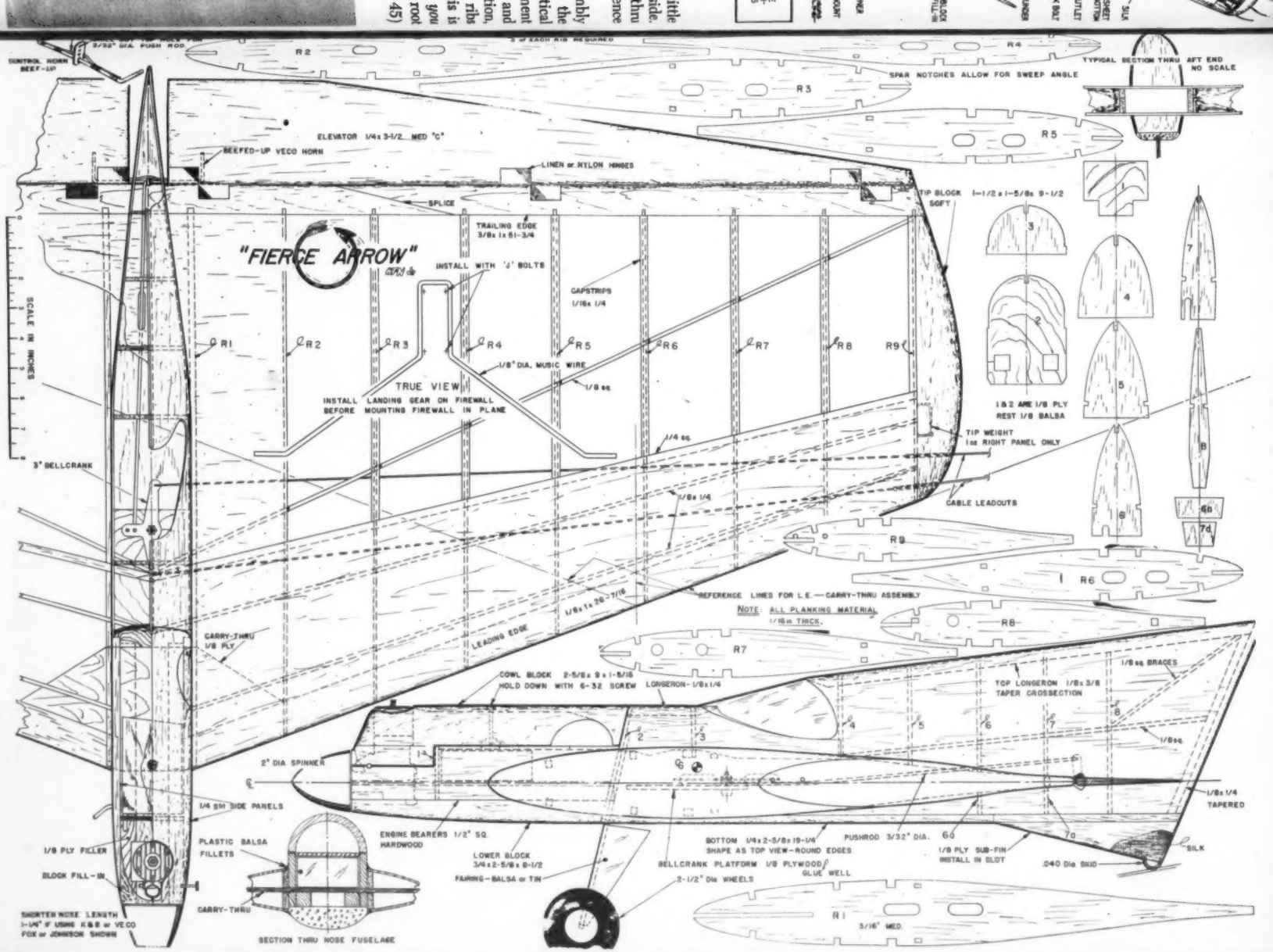
I have been fairly dissatisfied with ordinary stunt ships but I have been unable to find much wrong with the "Arrow," and I've tried, believe me! In any wind up to 25 mph, at least. At 30 she will do a pattern, but not too prettily.

After the usual study of the plans, pick out some good ⅜ x 1" hard balsa for the trailing edge. Splice is noted on plans. Be very careful that this piece is straight or the whole deal will be off. While this splice is setting, lay out two pieces of ⅜ x 1" for leading edges, marking rib locations and cutting them to exact shape. Cut carry-thru from ⅜" hard balsa, or ply if you prefer. Get it exact. These pieces are the basis for construction and if accurate, little difficulty will be experienced. Cut out all ribs and lay aside. Using the plans, pin down leading edges and carry-thru to form a glued-up unit and let dry. Use the reference lines shown for this.

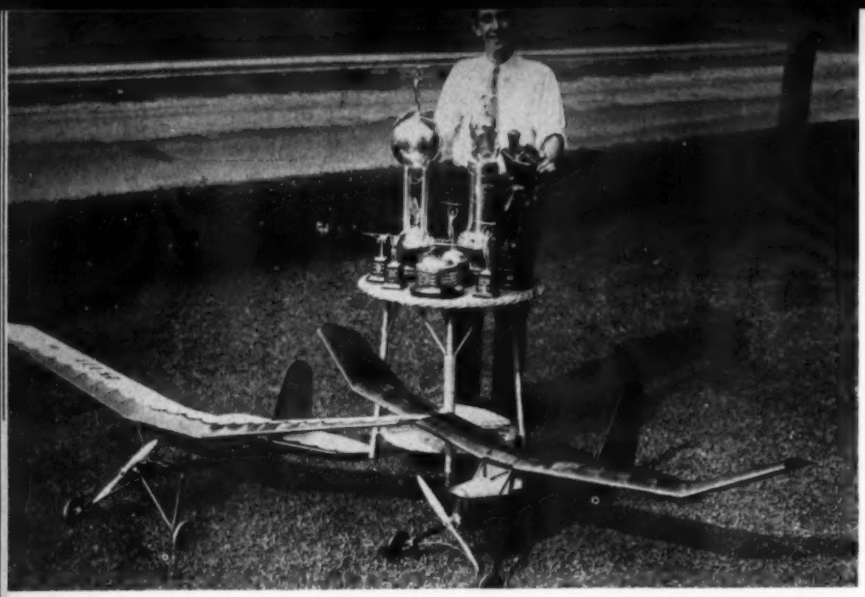
After leading and trailing edges are dried hard, assembly proceeds thusly. Cut 3/16" deep notches for ribs in the trailing edge and pin to straight work surface for vertical assembly. Root ribs are slipped onto carry-thru (no cement yet). Drop this assembly into notches in trailing edge and support with long pieces of wood in vertical position, squaring in both planes with triangles, etc. Slip tip ribs into position and check whole assembly carefully. This is the critical stage of assembly, so take your time. After you are satisfied it will line up, cement all the joints at root and tip, rechecking alinement. (*Continued on page* 45)

Four of the six FA's built to date. Minimum turn radius is 10.2 feet. No bobbled square corners. Margin of safety on the eights.

The whole family's proud, we'll have you know! Seriously, the first Fierce Arrow would do good pattern in 25 mph wind—not bad at 30.



FULL SIZE PLANS AVAILABLE. SEE PAGE 56.



Maxwell Bassett, the man who "stole" the 1933 Nationals from rubber jobs. Miss Philadelphia won Mulvihill stick event with 14:55. Cabin, Miss 3, the Moffett, 28:18; Stout 22:22.

RIP VAN WINKLES?

by CHARLES GRANT

► Model Plane Rip Van Winkles are finally emerging from their long slumber in the wilderness of "scientific" design. For twenty years they have slept peacefully while hobbyists have attached one prefabricated plane section to another in predesigned array.

Occasionally a waking genius envisions "new" design combinations for making models behave. Hal Roth is one of those who challenged and deflated the sacred myth that low-thrust pylon models are superior in flight to all others. In the July 1954 MAN, he aptly described a design arrangement of high thrust and low side that improves stability and provides consistent flying without detracting from performance.

Hal presents this as a *new* idea. But actually it has been merely slumbering like old Rip these past 23 years. This idea was born back in the '30s and gave spirited performance to many fine planes. Perhaps you would like to hear how it was conceived and used to confound old man "Crack-up."

When ambitious model designers undertook to convert their planes from rubber to gas power, back in the early "thirties," they discovered a most frustrating monkey wrench in the gear box. To create a rubber-powered model that consistently provided long and steady flights was comparatively simple. An assembly of efficient propeller and wing, and appropriate tail surfaces, all indiscriminately attached to a nondescript frame or fuselage, at relatively correct angles, flew as well as most precisely designed planes. But when gas engines replaced rubber in these designs the devil had a holiday.

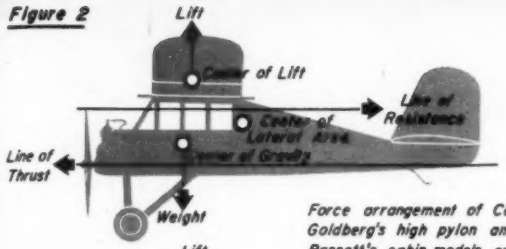
Why would these designs fly well with rubber power but not with gas? Time and (*Continued on page* 40)

Chuckling in his beard, one of modeling's real pioneers says free flight principles are back where they were 20 years ago. The gent in bright red hunting cap is ye editor.

So the high thrust line is new? Fifteen years ago Armand Vasquez used it effectively on a streamliner. Flaps helped get it down.

In 1933 first published gas model was KG, in MAN, and designed by the author. Joe Kovel, the "K," right, 1937 Nats, St. Louis.

Figure 2



Force arrangement of Carl Goldberg's high pylon and Bassett's cabin models are very similar. Low thrust line, high C.G. and L.R. tended to loop model.

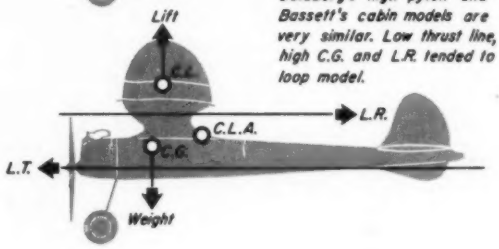
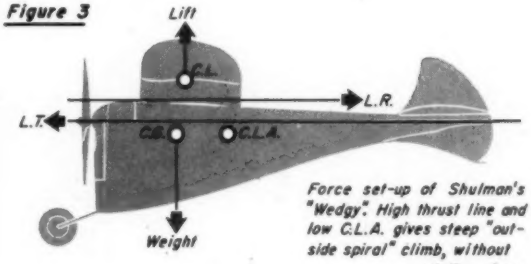
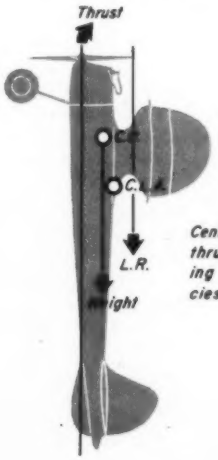


Figure 3



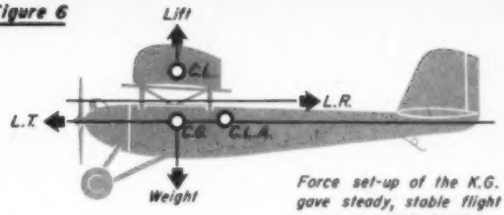
Force set-up of Shulman's "Wedgy". High thrust line and low C.L.A. gives steep "outside spiral" climb, without stall or loop.

Figure 4



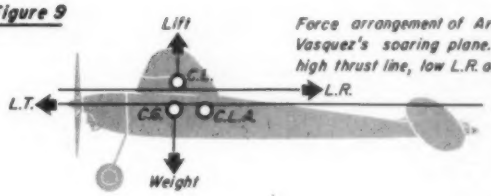
Center of gravity above thrust line creates stalling and looping tendencies.

Figure 6



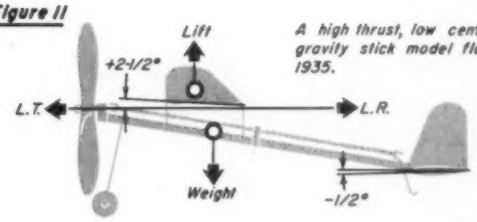
Force set-up of the K.G. This gave steady, stable flight with never a crash landing.

Figure 9



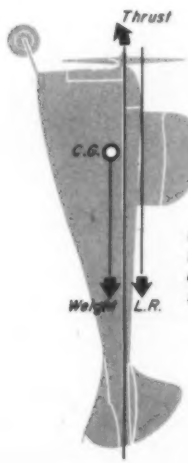
Force arrangement of Armand Vasquez's soaring plane. Note high thrust line, low L.R. and C.L.

Figure 11



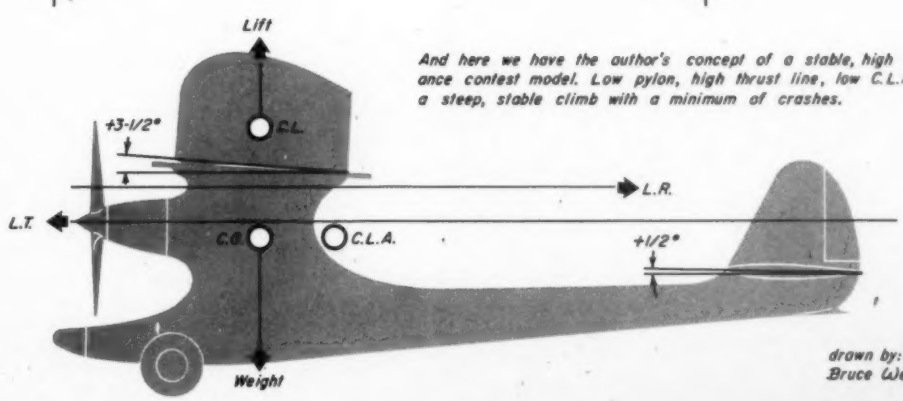
A high thrust, low center of gravity stick model flown in 1935.

Figure 10



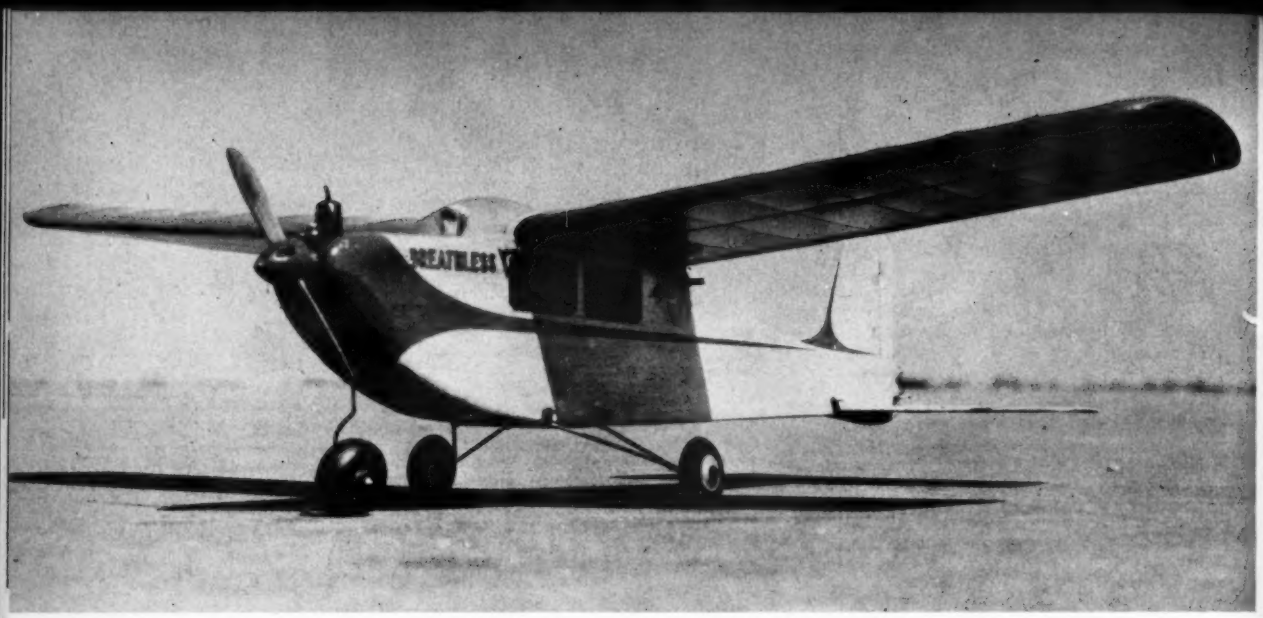
Center of gravity below thrust line provides strong corrective moments in a steep climb or stall.

Figure 12

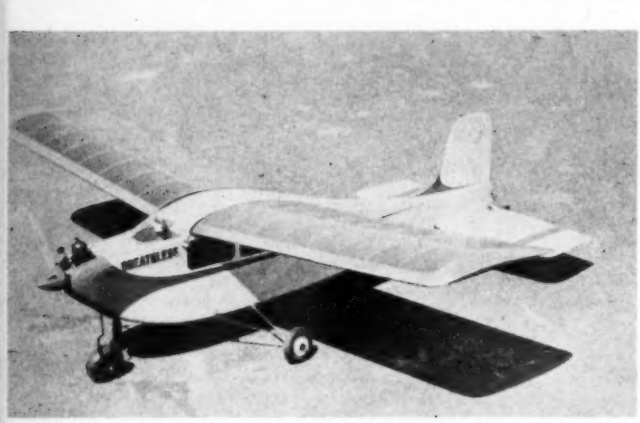


And here we have the author's concept of a stable, high performance contest model. Low pylon, high thrust line, low C.L.A. provide a steep, stable climb with a minimum of crashes.

drawn by:
Bruce Wennerstrom



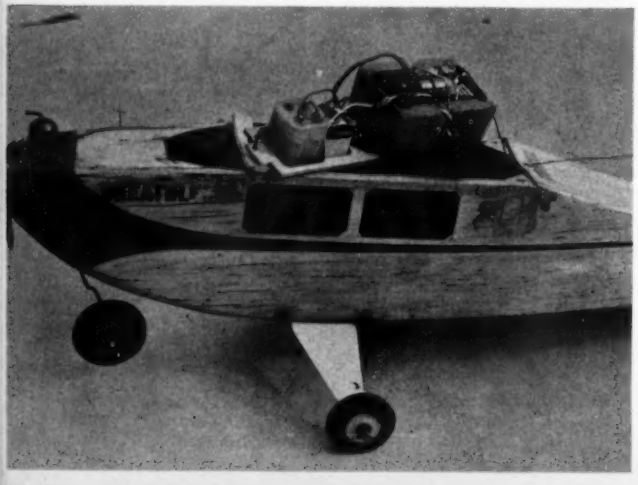
Bubble canopy and pilot add realism without a weakening windshield, permit high thrust line. Main gear made from music wire or aluminum.



Wing is simple and robust—nothing squeaky here. Very stable, ship will recover from any attitude, hands off. Handy thing to remember.

For small flying sites, this Half-A powered RC, is simple, strong, and highly maneuverable. And it is superb for a beginner.

Though flown with both Babcock BCR-10 and Deltron, latter installation shown here. The plywood tray fits into fuselage horizontally.



BREATHLESS

by KEN WILLARD

► The objective was a rugged, reliable RC model, suitable for sport or contest flying, powered by Half-A glow or diesel motor, and as simple as possible to construct. All of the flight proven aerodynamic design factors were listed and the design was laid out. All of the crash-proven structural strength features were incorporated into the detail construction of the model. The result was a sheet-balsa fuselage and tail, silk covered, and a conventional built-up wing, silk covered, all held together with the finest shock absorbing fasteners yet devised—rubber bands. Bracing is distributed so the model will withstand hard landings easily, and only requires minor repair even after a crash due to malfunction (which might be mechanical, electrical, extraneous or human). The model will recover from any flight attitude and assume normal level flight just by neutralizing the controls.

Construction

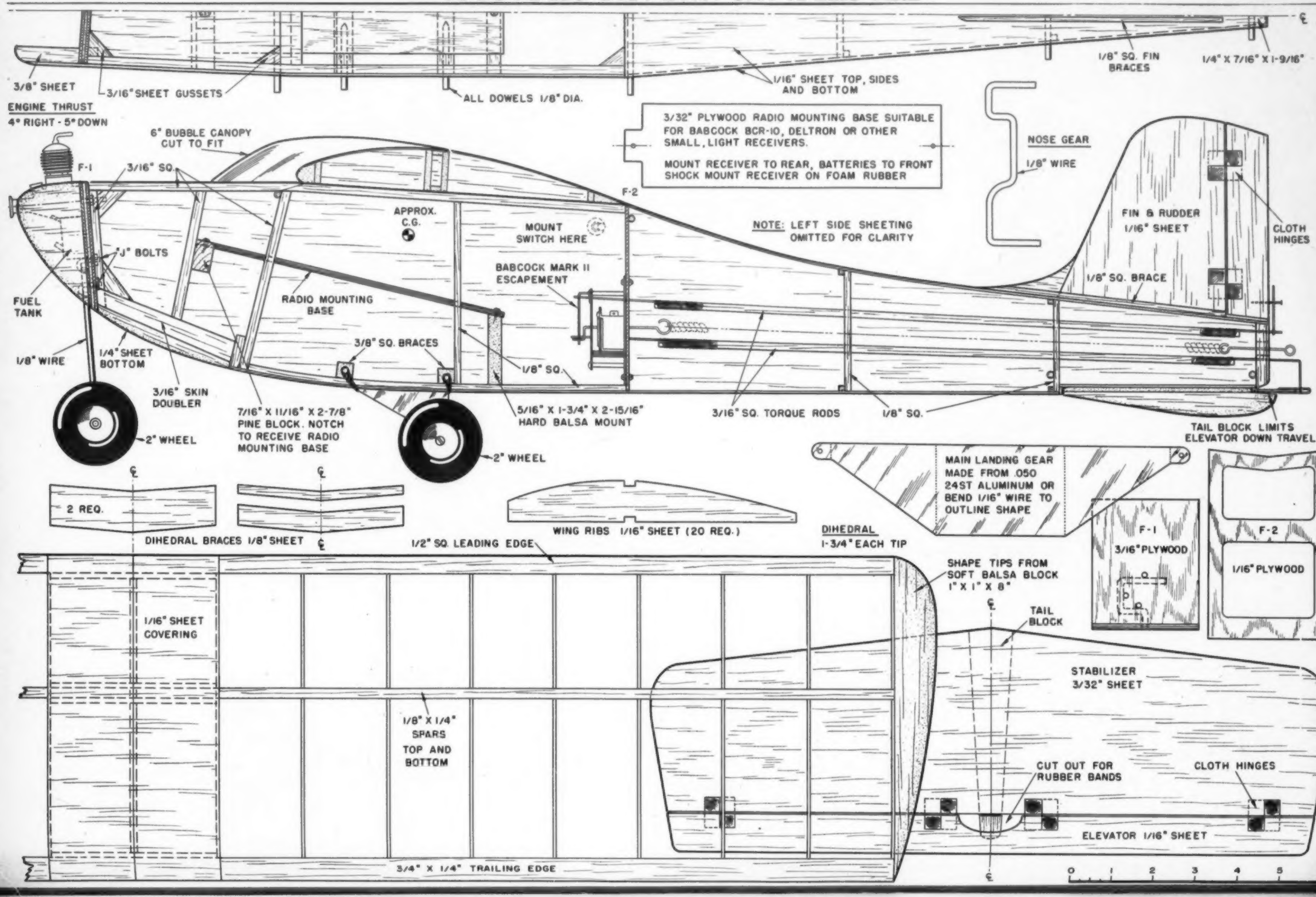
The plans show the wood sizes. For a Half-A, medium hard balsa, except where plywood is specified, has ample strength, especially after the framework is silk covered.

Cut out the two fuselage sides from 1/16 x 5 sheet, cement the longitudinal and upright braces in place, and let dry. Note the downthrust provided for firewall mounted engine, as well as right thrust, accomplished by proper placement of the firewall braces on the two sides.

When putting the sides together, cement the tail block and escapement bulkhead in place first. This helps to obtain proper alinement. Next, pull the sides together and cement the cross braces in place where the leading edge of the wing is positioned, making sure that the sides are pulled in equally. Finally, do the same at the firewall, and this will give you the proper alinement to give right thrust.

Install the escapement and torque rods at this time, since it is easier to get inside the fuselage before the top and bottom sheeting is added. (*Continued on page* 40)

FULL SIZE PLANS AVAILABLE. SEE PAGE 56.



by OSCAR CZEPA

CZEPA on Airfoils

Respected in every land for his work with gliders, the author indirectly proves the stunning shortcomings of a quickie approach to Nordics.

Congratulating 1953 Nordic winner Hansen. Czepa, 1951 winner, right. In Yugoslavian meet, Hansen capitalized on wet, windy weather to win with all-around model, published April '54.

► In this article and the one to follow, the author presents in simple form a summary of well known facts about airfoils from aeronautical literature and personal experiences of the "Vienna School". This information is worthy of note for those faced with a choice of an airfoil for towline gliders.

Airfoils for Gliding

In no living thing does one feel closer to original creation than with a bird. Particularly the wing of a bird or insect expresses the physical and chemical needs which it was meant to fulfill. But what man would have known, millions of years ago, that the power to hold an object in the air could be won from a curved surface?

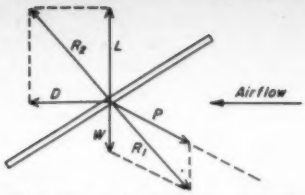
Now, as in a bird, the most important part of a glider is its wing. The section (crosswise) of the wing is called its airfoil, and it is from this section that most of the performance of the model comes. Similarly important are the wing outline, its aspect ratio, size, and the finish of its surfaces. This article, however, is concerned only with the airfoil section.

The fact that a butterfly's wings are flat indicates that even the simplest airfoil, a "flat plate", can fly. One can view the paper surface of a kite as the same thing. When the kite begins to rise, it does so because the wind strikes this surface from underneath at an angle. Even in this simple situation, it is possible to identify important components of flight to be seen in Diagram I. Here one sees that the resultant of, on the one hand, pull on the line (P) and weight (W) balances the resultant of lift (L) and drag (D). The air which comes against the kite on its underside is pushed downward as a result of the pressure on the kite and lift results. Flat plates, therefore, can lift if they are placed at an angle against moving air. This is approximately the situation when one tows a glider, but for the normal glide, the flat plate at an angle is no longer sufficient. Why is this the case? A butterfly can glide long distances without flapping its wing, and a small model can fly well with the flat wing as long as the lift won is not overloaded with weight, but this is not the entire story. To completely answer the question raised here, drag must be considered.

Any body placed in a flow of air re-

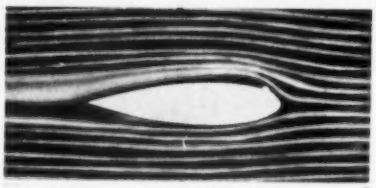
Among first users of the forward fin for free-flight gas, Czepa flew this airplane at the FAI power finals. Today's efficient high-thrust line jobs tend to wind in — fin eliminates this.

1.



Forces acting on a flat plate airfoil, of which a kite is one example, are diagrammed above. R_2 is the Resultant of L (Lift) and D (Drag), and is equal and opposite to R_1, the Resultant of the Weight of the kite, W, and the Pull of the string, P.

2.



Note the laminar separation on the underside at the thickest point of the airfoil shown above. In contrast on the upper surface the flow begins to break away, but thru its turbulence returns to the wing.

3.

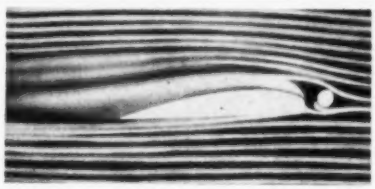


Photo above shows the effect of a turbulator located just in front of the wing's leading edge. The turbulator must be made large because of the low speed of the smoke canal to make the result of the experiment visible.

4.

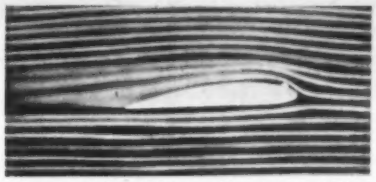
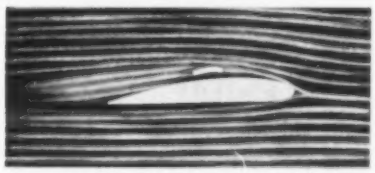


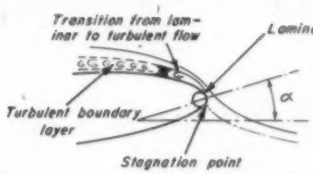
Photo above shows the effect on airflow of a turbulator located on the wing's upper surface. Note the laminar separation of the air immediately after its crossing the turbulator. Turbulent return of the air stream at 35% of the chord.

5.



Guide vane above upper surface of wing was experimental attempt to return the laminar boundary layer to the wing's upper surface. Weak departure of laminar airflow at 65% of the chord. A very promising project for the experimentally minded.

6.

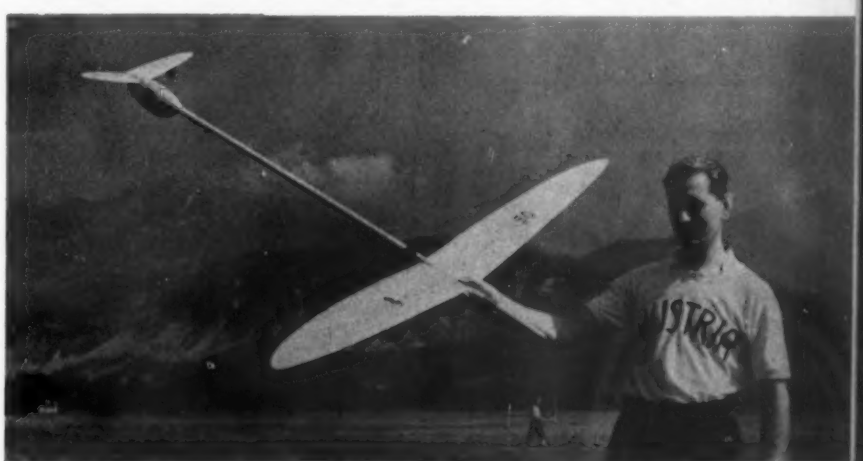


Simplest method of holding the boundary layer to the upper surface of the wing is to use a relatively sharp leading edge on the airfoil. (Drawing is taken from F.W. Schmitz's "Modelifluegel und Turbulenzeffekt.)

sists being pushed; this resistance is drag. The amount of this drag will increase as the size of the body grows, as the speed of flow of the air increases and will depend on the shape of the body, as well as its exterior finish. As a case in point, a hand stretched out the window of a moving car will produce drag because the air pressure is increased against the frontal areas, however decreased behind it, leaving in its wake a burbling area of air which has a sucking effect on the body being passed through it and is the major factor in producing drag. It is for this reason that the flat plate is of little practical use to the aero-modeller; the more lift we demand of it (by increasing the angle of it against the air) the more our drag, and this drag increases so rapidly that the lift is no longer of value.

Moving from the example of the butterfly to a buzzard or a falcon, we note an airfoil no longer flat, but curved, in other words a "curved plate". Also we note that even for their size, these birds are heavier. More weight demands more lift! This was nature's reason for curving the wing of the larger birds. With the flat plate, as the angle of incidence increases, the airflow will soon break away from the upper surface. With the curved plate, however, even at considerable incidence angles, the airflow still lies on the upper surface.

Because the air must travel a longer distance on the upper side of the wing, it must move faster above the wing, in order to meet the air from the underside at the back of the airfoil at the same time. According to the Bernoullian law, as airflow speed increases, static pressure decreases; this explains the vacuum on the wing's upper side. Scientific measurements have shown that this vacuum is more important to total lift *(Continued on page 58)*

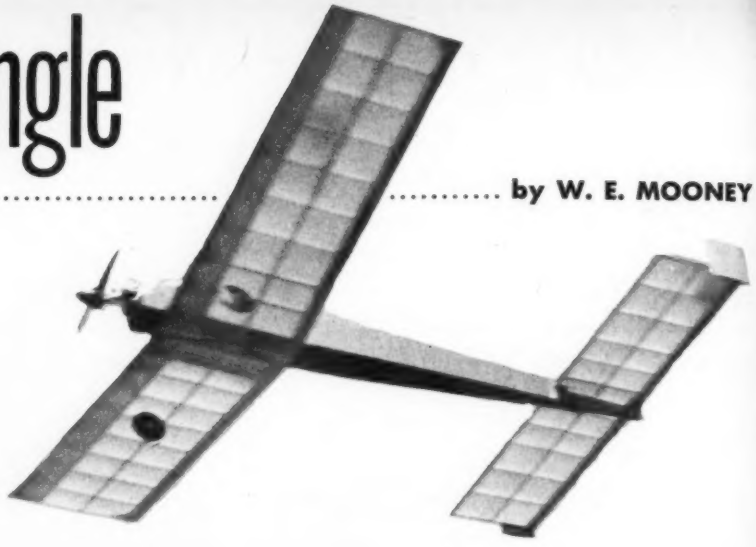


From the 328-foot line used in 1951, Czepa's 91 in. Nordic averaged 5:40 in calm air. Both wing and stabilizer of solid sheet balsa. Pod for cross-section was at the rear to supply fin area.

the wrecktangle

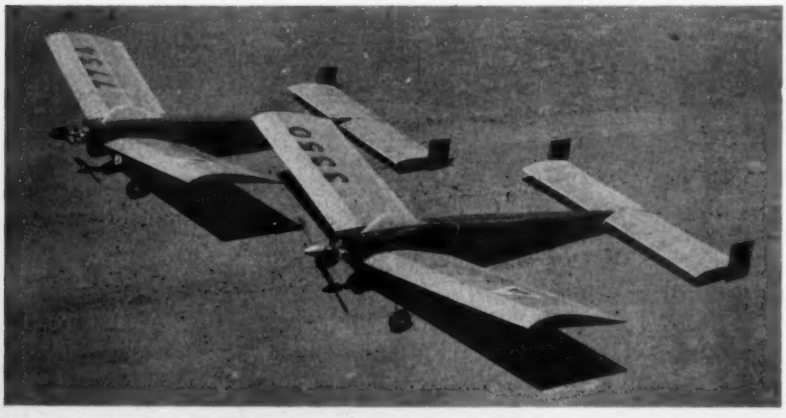
by W. E. MOONEY

Weary of pylons? Then try a unique low-wing contest design for the .049's. Flies like a high thrust line job.



Flipping prop info action, Walt readies ship for take-off. Climb, wide left circles, right glide.

Family affair. Number 3350, foreground, was built by Mrs. Mooney; second ship by designer Walt.



► The Wrecktangle was designed as a rugged, simple, quick to build, free flight contest design which by its unique configuration would be different from the run of the mill pylon type contest airplane. It is a low wing, and as its name implies, is rather squarish in appearance. However, it has some visual appeal in spite of its angular lines.

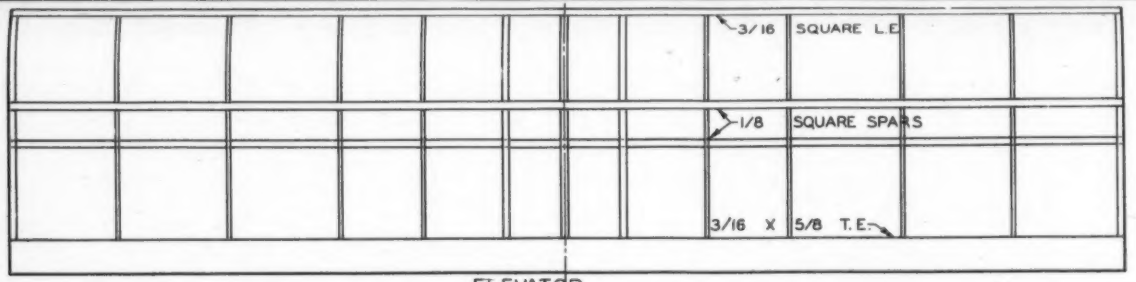
A closer look at the model will reveal that in the force set up this airplane is very close to being a conventional high-thrust line design and, in fact, it has similar flying characteristics, including a high speed climb which grabs altitude without hanging on the prop. From an operational standpoint it is simplicity itself with the eyedropper tank and its wide-tread landing gear.

Well, let's start building the Wrecktangle so that we can start flying. Because of the size limitations on the plans, not all of the right wing is shown. It must be extended four ribs beyond the last one shown, or eight inches. No fuselage top view is shown, but for this simple design it is not necessary.

The wing and the elevator are conventional structures. Cut ribs from 1/16 in. or ⅛ in. sheet balsa as required, according to the drawing. The elevator is assembled on the plan by laying down the leading and trailing edges and the rear spar, cementing the ribs onto these and then adding the forward spar.

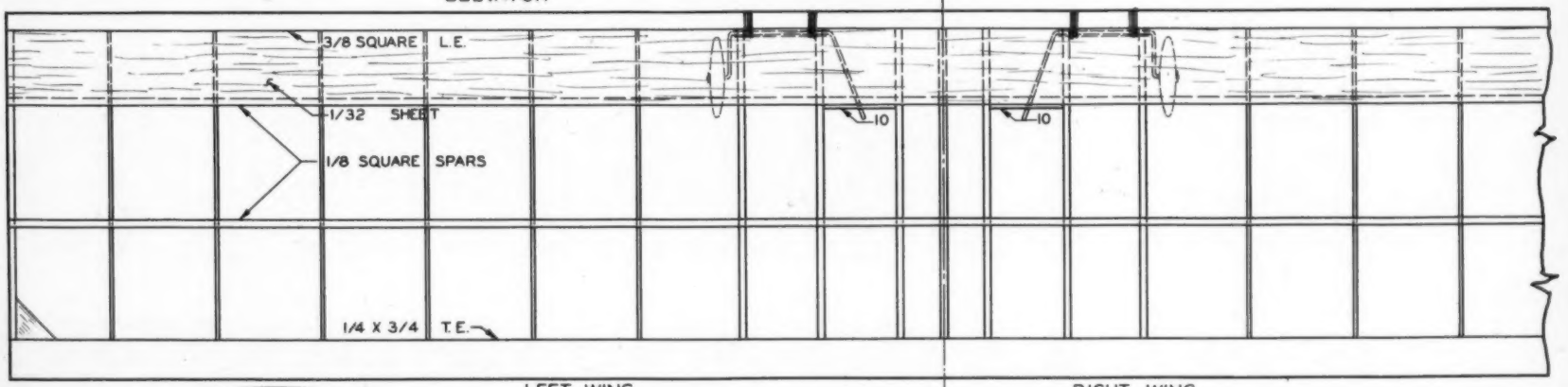
The wing is done in a similar manner. Start by laying down the leading and trailing edges and the lower spars. These should be full length for both wings. Now cement in place all the ribs except the center one. Notch the leading and trailing edges and the lower spars for the dihedral break and allow the cement to dry. (While the wing is drying you can work on the fuselage.) When thoroughly dry remove the

(*Continued on page* 38)

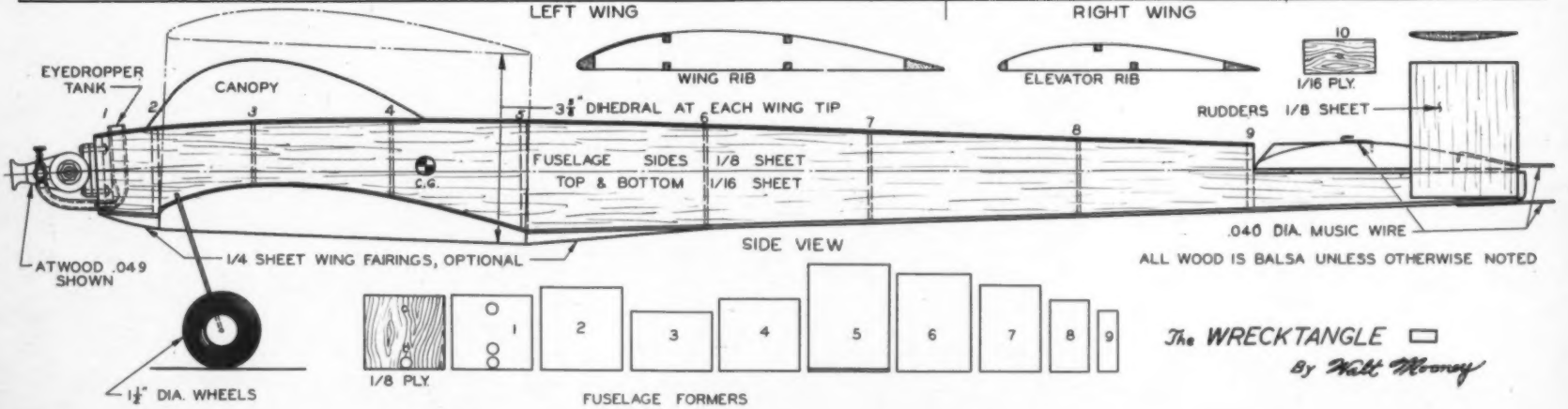


ELEVATOR

LANDING GEAR DETAIL



LEFT WING RIGHT WING

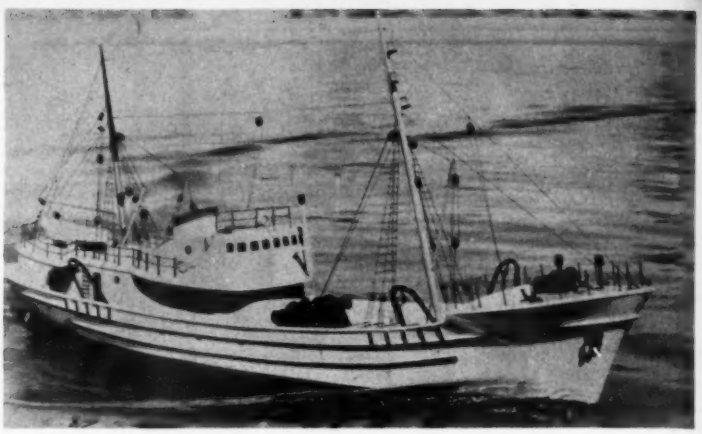


The WRECKTANGLE ▭
By Walt Mooney

FULL SIZE PLANS AVAILABLE. SEE PAGE 56.

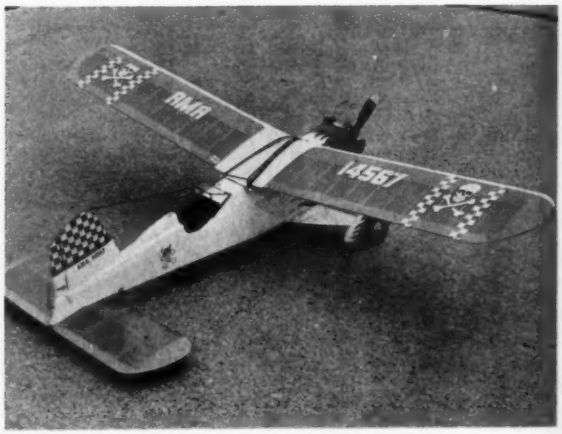
by EDWARD J. LORENZ

Radio Control News



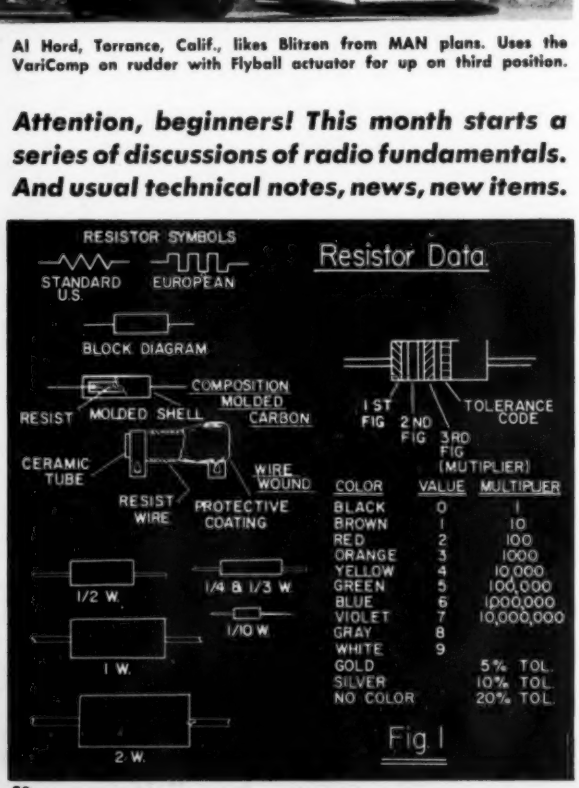
Unretouched photograph of new Babcock North Star Trawler in action. Scale easy-driving hull lines make it realistic. Should be obvious, that we need engine that chug-chugs.

Al Hord, Torrance, Calif., likes Blitzen from MAN plans. Uses the VariComp on rudder with Flyball actuator for up on third position.



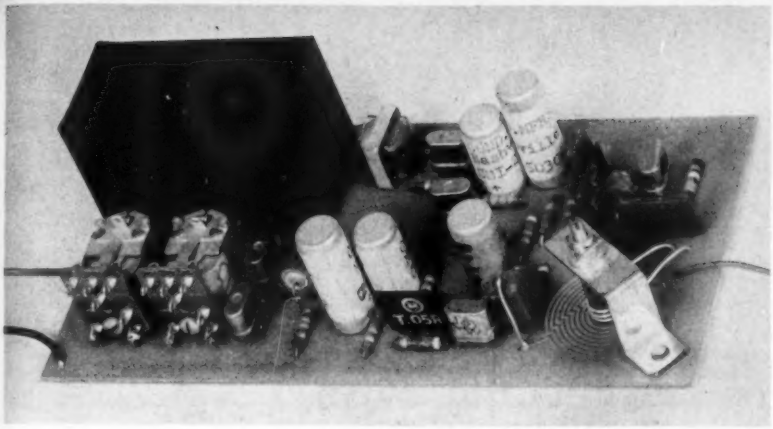
Open cockpit, pilot, and gay color scheme, mark this semi-scale job by Charles Danila. Ohlsson .23 and a Lorenz two-tuber on rudder.

Attention, beginners! This month starts a series of discussions of radio fundamentals. And usual technical notes, news, new items.



► From the avalanche of mail from new entrants into the RC field, we'd say that radio control of models will be around for a long, long time, provided the biginner is given enough information to keep him well enough informed to make progress. Despite the reviews on equipment we have presented from time to time, the apparent need is for basic information on components and how they make up a circuit. After all, the number of basic components actually is very small; it is the manner in which they are assembled that makes the difference. First, it should be mentioned that there are many excellent books available which will answer most of your questions. The most versatile one is the Radio Amateur's Handbook, available through radio supply houses, or from The American Radio Relay League, West Hartford, Conn. The price is $3.00 and the handbook is for beginners as well as experts. In order to understand how the components function, it is necessary to know something of the nature of electricity and the flow of electrons.

Voltage as is normally used in RC circuits is the electromotive force which pushes the electrons through a conductor to cause a flow of current. This may be likened to the pressure applied to the input of a water hose, which pushes the water through the hose, thus causing a flow of water. Without voltage in a circuit or pressure in a hose, there is no flow of electrons, or water. To begin this series, we will deal with DC, or direct current. This means that DC voltage is a one-directional voltage, with an electro-



Two-channel receiver by Thomas Eng. Co. fully transistorized, printed circuit, claimed to be reliable on 15 Volts, to have a six-mile range with "suitable" transmitter. Weight seven ozs.

German rudder servo by Graupner is self-neutralizing. Manufacturer calls it Telematic-Alpha.

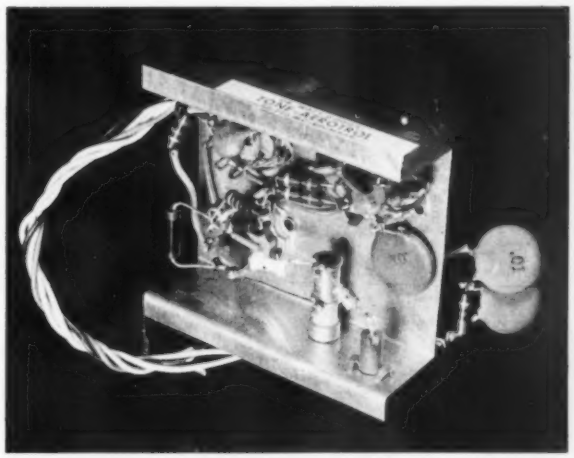
motive force, or pressure, equal to the source, which is generally a battery in our case. When we have a motivating force or pressure which causes a flow of electrons, the amount of current, or flow, is determined by the resistance of the circuit. The resistance of an electrical circuit may be likened to the size of a water hose, which restricts the passage of water, or to an adjustable nozzle which permits a given amount of water to leave the hose.

The first component to be discussed will be the resistor, or current-restricting element. A resistor is calibrated in, or described as having, so many ohms. An ohm is the unit of resistance and is the resistance of a column of mercury weighing 14.45 grams, with a uniform cross-section and a height of 106.3cm at 0 degrees centigrade. A circuit has a resistance of one ohm when an applied electromotive force of one volt causes a current of one amp to flow.

Now that you know a resistor is a current limiting device for DC circuits, let's find out how they are made and a little of the other things to consider when selecting a resistor. A resistor is generally made of a carbon composition which is either molded in the form of a small rod or is coated on the surface of a small ceramic tube. Leads are attached to the ends of the resistor and the unit is then molded in a thermosetting resin for environmental protection. The value of a resistor is either stamped on the body or is given by a color code. In addition to the fixed-value carbon composition resistor mentioned, resistors may be made by winding a high resistance wire on a ceramic form. These wire-wound jobs are used for high wattage, (one watt is equal to one volt pressure, multiplied by one ampere of current flow; to illustrate: 110 volts, times one ampere, equals about 100 watts, as in an electric bulb)—dissipation and characteristics which may not be present in other types or resistors.

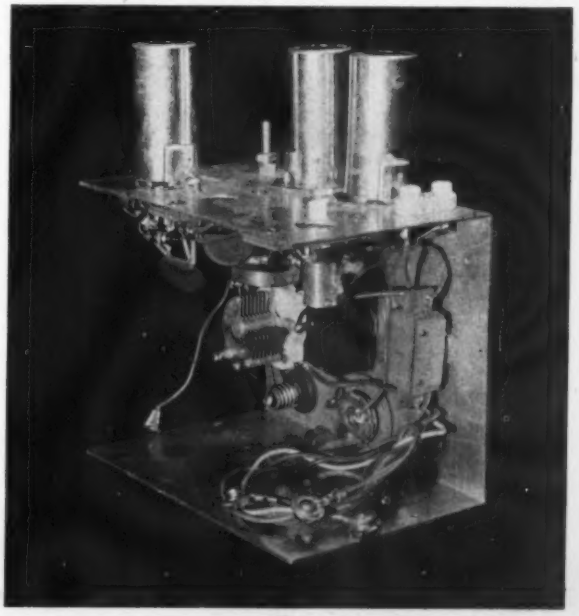
Wire wound resistors are generally not used directly in RC work. About the only application in RC work would be for battery chargers or other applications where high current and voltage are encountered. Practically all RC work uses composition carbon units. You may have noticed that the physical size of molded resistors, and others, varies, even though the resistance value is the same. This is due to the wattage rating of the unit. Most RC work uses ¼, ½ and 1 watt resistors. Wattage is power, and with a given resistance is governed by the voltage applied. The more voltage applied to given value of resistor, the larger the physical size must be to dissipate the heat. Wire wound resistors are built to stand more heat, hence the physical size is generally smaller than a composition resistor of similar wattage.

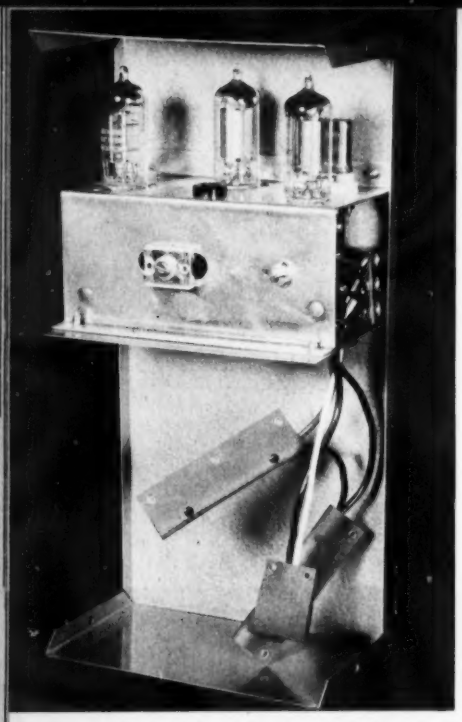
Figure 1 shows the symbol for a resistor as it would ap-



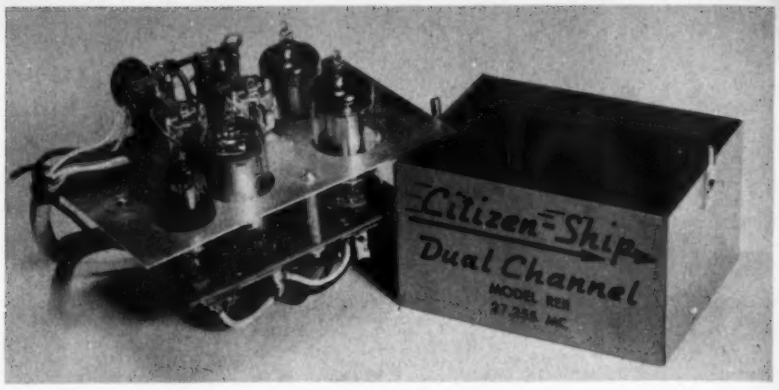
Tone Aerotrol receiver, underneath view. Designed by Walt Good, it comes either complete, or as ready-to-go chassis, less tubes, relay.

Tone Aerotrol transmitter, also comes as chassis, less tubes, crystal, cabinet, or completed unit. Single channel receiver has three tubes.



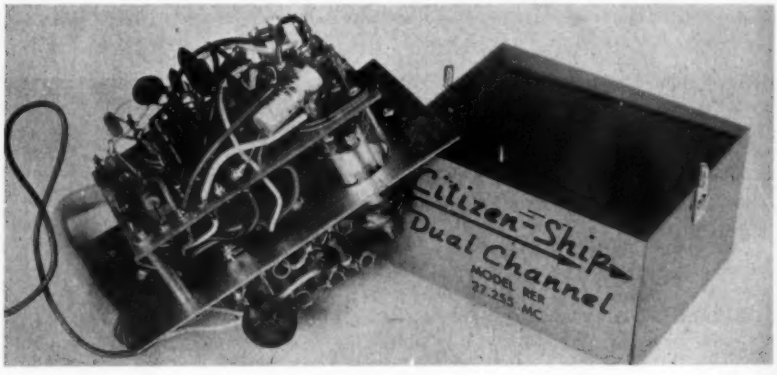


Inside Citizen-Ship Dual Channel, 27.255 transmitter. Hand held, rear is removable for access.



Above—Citizen-Ship Dual Channel receiver. Box can be left cemented to foam rubber padding.

Below—Two level receiver construction. Has four tubes. Can provide a simultaneous action.



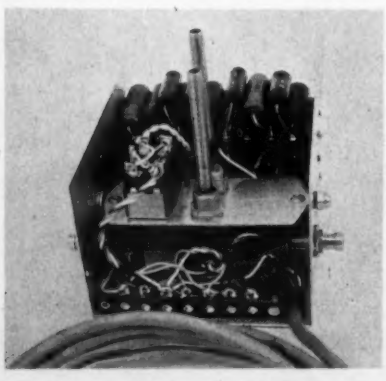
Radio Control News—*continued*

pear in RC circuits. Also shown is a sometimes used European symbol. Comparative physical sizes of different resistors are also shown. Next month we'll cover Ohm's law and start on capacitors, gradually working into all components and how they function in circuits we normally use for RC work. It is not intended that MAN become a text book on radio or electronics, since there are many books devoted to these subjects in your library. Note: Small composition carbon resistors are often damaged by excessive heat during soldering or by a strain being placed between the leads and the body. This generally applies to the 1/10, ¼, ½ and 1 watt sizes. Resistors can be placed in series and parallel, to obtain different resistance and wattage ratings. Calculations for this will be given when Ohm's law is discussed.

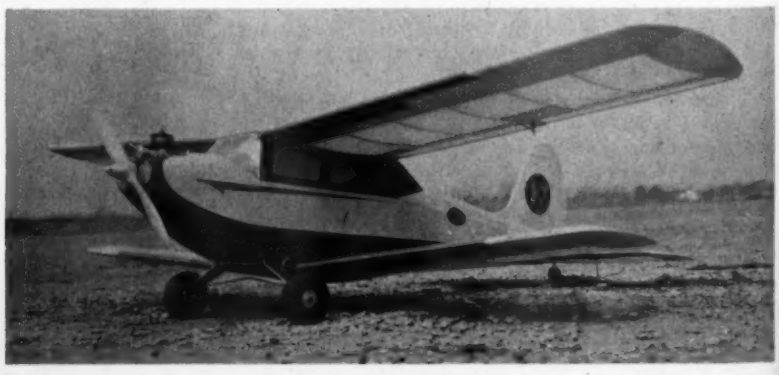
Many times in the past we have mentioned instances where batteries have developed internal breaks. This has occurred in receiver and transmitter B batteries and is evidenced as an intermittent break or complete lack of voltage. We don't know the make of battery that was involved in each case. However, we have encountered no trouble with our transmitter batteries. For receiver use, we use Burgess U20's. These particular units have a silver paste for making internal connections, the paste having enough plasticity to effectively resist hard shocks. As we've mentioned before, you depend upon your battery for a source of power, so don't treat it in a casual manner. The battery box should be firmly mounted and the batteries themselves should never be dropped or thrown around.

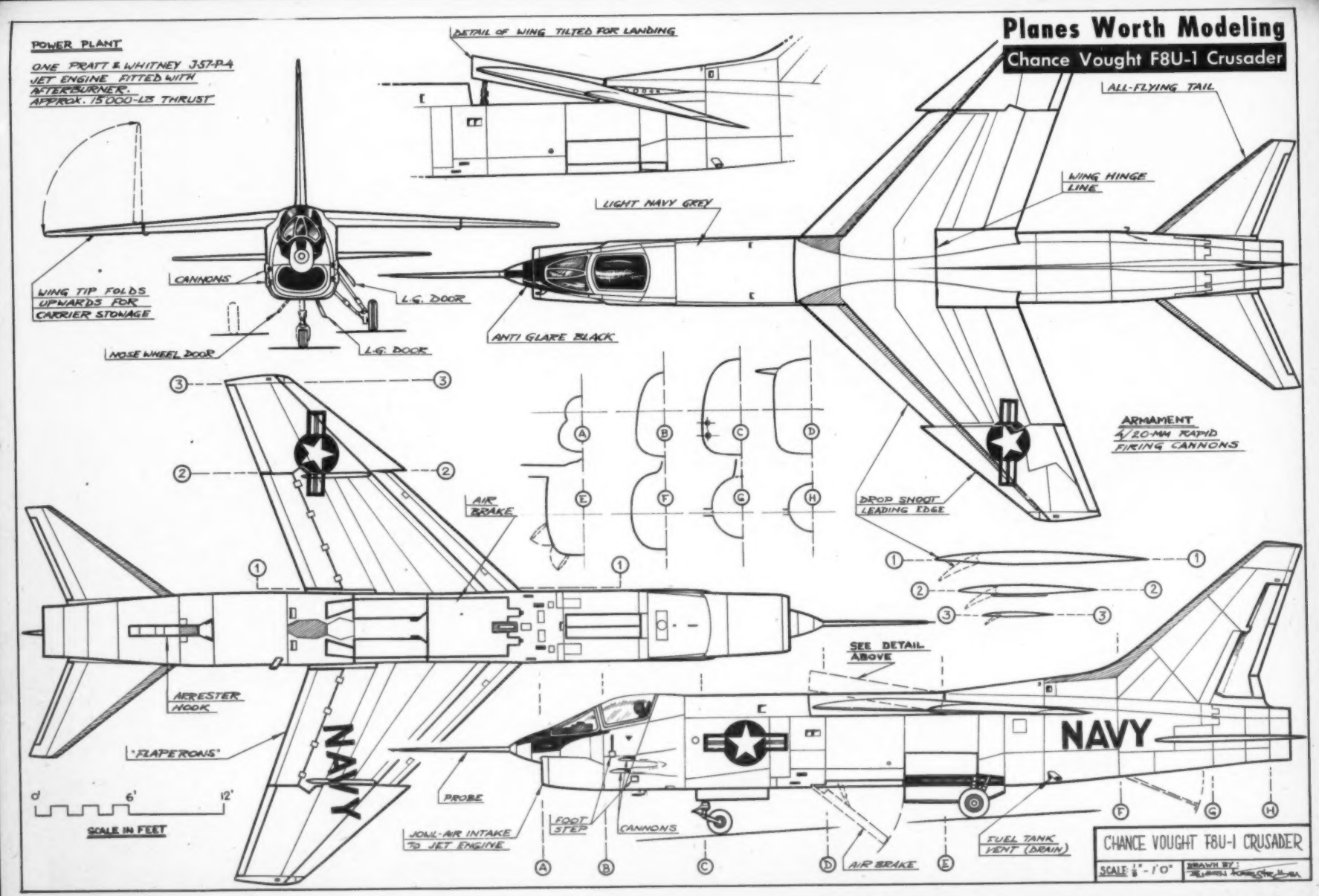
Speaking of batteries, many readers have become excited over the new 'atomic batteries', said to have a life span of as much as five years. This is perfectly true, except for one thing. The power output is very low, at the present time. Some of the cells are very small and have a power output of 20 microwatts. This power output is but 1/500th the power obtainable from hearing aid (*Continued on page* 61)

Hal deBolt's control box! Piled firecrackers.

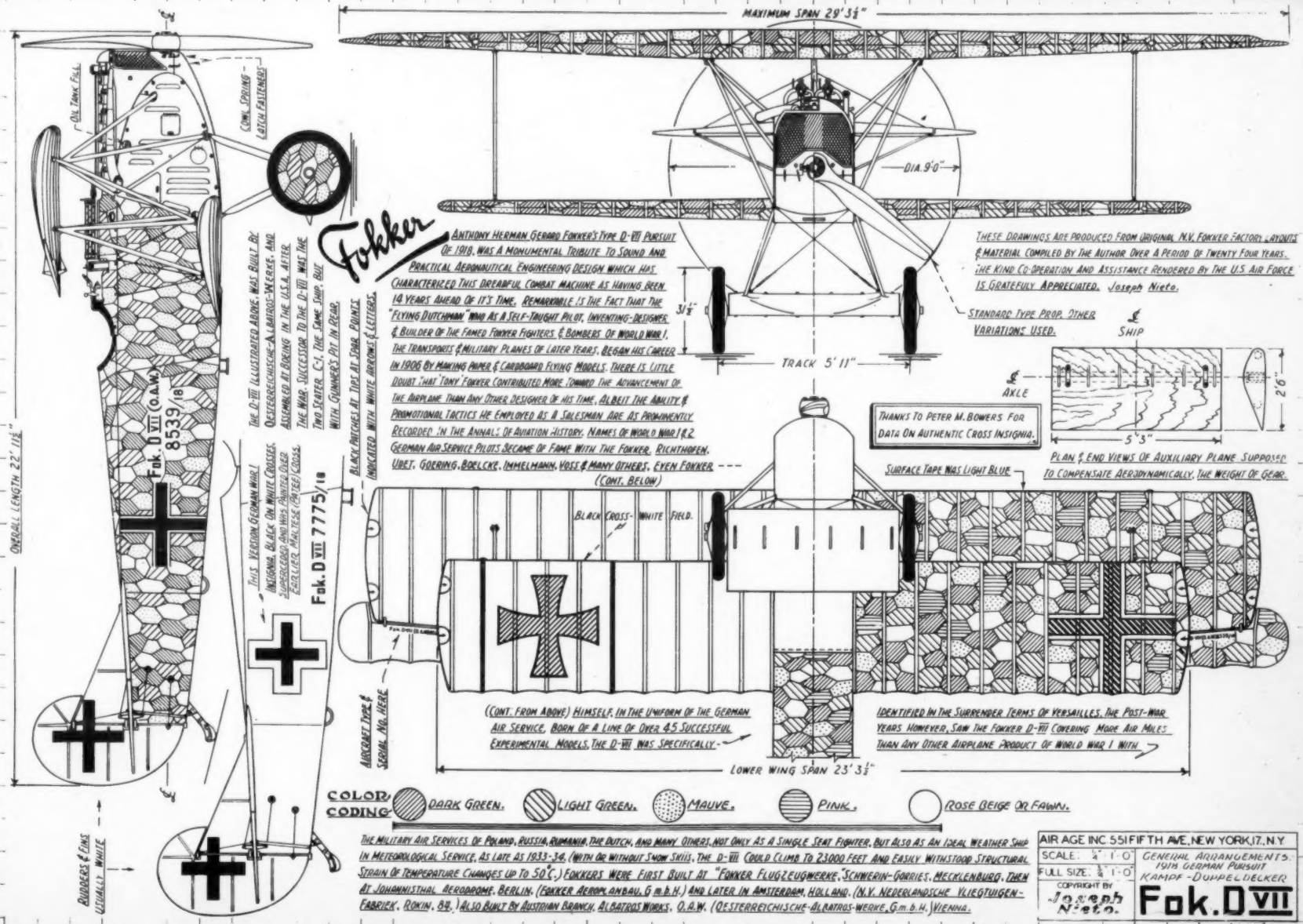


His 52 in. biplane has Bramco 8-channel, giving flaps, brakes, ailerons, etc. This on Fox .19.




Planes Worth Modeling
Chance Vought F8U-1 Crusader
POWER PLANT
ONE PRATT & WHITNEY J57-P-4 JET ENGINE FITTED WITH AFTERBURNER. APPROX. 15000-LBS THRUST
DETAIL OF WING TILTED FOR LANDING
ALL-FLYING TAIL
WING HINGE LINE
LIGHT NAVY GREY
WING TIP FOLDS UPWARDS FOR CARRIER STOWAGE
CANNONS
L.G. DOOR
NOSE WHEEL DOOR
L.G. DOOR
ANTI GLARE BLACK
ARMAMENT
4/20-MM RAPID FIRING CANNONS
AIR BRAKE
DROP SNOOT LEADING EDGE
SEE DETAIL ABOVE
ARRESTER HOOK
"FLAPERONS"
NAVY
NAVY
PROBE
JOINT-AIR INTAKE TO JET ENGINE
FOOT STEP
CANNONS
AIR BRAKE
FUEL TANK VENT (DRAIN)
SCALE IN FEET
CHANCE VOUGHT F8U-1 CRUSADER
SCALE 1/8" - 1'0"
DRAWN BY:

FOKKER D-7 by Joe Nieto. Plans of this most famous of World War 1 fighters had been



Fokker

ANTHONY HERMAN GERARD FOKKER'S TYPE D-VII PURSUIT OF 1918, WAS A MONUMENTAL TRIBUTE TO SOUND AND PRACTICAL AERONAUTICAL ENGINEERING DESIGN WHICH HAS CHARACTERIZED THIS DREADFUL COMBAT MACHINE AS HAVING BEEN 18 YEARS AHEAD OF IT'S TIME. REMARKABLE IS THE FACT THAT THE "FLYING DUTCHMAN" WHO AS A SELF-TAUGHT PILOT, INVENTING-DESIGNER & BUILDER OF THE FAMED FOKKER FIGHTERS & BOMBERS OF WORLD WAR I, THE TRANSPORTS & MILITARY PLANES OF LATER YEARS, BEGAN HIS CAREER IN 1906 BY MAKING PAPER & CARDBOARD FLYING MODELS. THERE IS LITTLE DOUBT THAT TONY FOKKER CONTRIBUTED MORE TOWARD THE ADVANCEMENT OF THE AIRPLANE THAN ANY OTHER DESIGNER OF HIS TIME. ALBEIT THE ABILITY & PROMOTIONAL TACTICS HE EMPLOYED AS A SALESMAN ARE AS PROMINENTLY RECORDED IN THE ANNALS OF AVIATION HISTORY. NAMES OF WORLD WAR I & 2 GERMAN AIR SERVICE PILOTS BECAME OF FAME WITH THE FOKKER. RICHTHOFEN, UBET, GORING, BOELCKE, IMMELMANN, VOSS & MANY OTHERS, EVEN FOKKER ---

(CONT. BELOW)

THE D-VII ILLUSTRATED ABOVE, WAS BUILT BY OESTERREICHISCHE-ALBATROS-WERKE, AND ASSEMBLED AT BOEING IN THE U.S.A. AFTER THE WAR. SUCCESSOR TO THE D-VII WAS THE TWO SEATER C-I, THE SAME SHIP BUT WITH GUNNER'S PIT IN REAR.

BLACK PATCHES AT TIPS OF STAB & PLANES INDICATED WITH WHITE BORDERS & LETTERS.

THIS VERDON GERMAN WHITE INSIGNIA, BLACK ON WHITE CROSSES, SUPERCEDED AND WAS PAINTED OVER EARLIER MALTESE CROSS.

AIRCRAFT DOR & SERIAL NO. HERE

THESE DRAWINGS ARE PRODUCED FROM ORIGINAL N.V. FOKKER FACTORY LAYOUTS & MATERIAL COMPILED BY THE AUTHOR OVER A PERIOD OF TWENTY FOUR YEARS. THE KIND CO-OPERATION AND ASSISTANCE RENDERED BY THE U.S. AIR FORCE IS GRATEFULY APPRECIATED. Joseph Nieto.

STANDARD TYPE PROP. OTHER VARIATIONS USED.

THANKS TO PETER M. BOWERS FOR DATA ON AUTHENTIC CROSS INSIGNIA.

PLAN & END VIEWS OF AUXILIARY PLANE SUPPOSED TO COMPENSATE AERODYNAMICALLY, THE WEIGHT OF GEAR.

SURFACE TAPE WAS LIGHT BLUE

(CONT. FROM ABOVE) HIMSELF, IN THE UNIFORM OF THE GERMAN AIR SERVICE. BORN OF A LINE OF OVER 45 SUCCESSFUL EXPERIMENTAL MODELS, THE D-VII WAS SPECIFICALLY -

IDENTIFIED IN THE SURRENDER TERMS OF VERSAILLES, THE POST-WAR YEARS HOWEVER, SAW THE FOKKER D-VII COVERING MORE AIR MILES THAN ANY OTHER AIRPLANE PRODUCT OF WORLD WAR I WITH

COLOR CODING: DARK GREEN. LIGHT GREEN. MAUVE. PINK. ROSE BEIGE OR FAWN.

THE MILITARY AIR SERVICES OF POLAND, RUSSIA, RUMANIA, THE DUTCH, AND MANY OTHERS, NOT ONLY AS A SINGLE SEAT FIGHTER, BUT ALSO AS AN IDEAL WEATHER SHIP IN METEOROLOGICAL SERVICE. AS LATE AS 1933-34, (WITH OR WITHOUT SNOW SKIIS, THE D-VII COULD CLIMB TO 23000 FEET AND EASILY WITHSTOOD STRUCTURAL STRAIN OF TEMPERATURE CHANGES UP TO 50°C.) FOKKERS WERE FIRST BUILT AT "FOKKER FLUGZEUGWERKE, SCHWERIN-GORRIES, MECKLENBURG, THEN AT JOHANNISTHAL AERODROME, BERLIN, (FOKKER AEROPLANBAU, G.m.b.H.) AND LATER IN AMSTERDAM, HOLLAND. (N.V. NEDERLANDSCHE VLIEGTUIGEN-FABRIEK, ROKIN, 88.) ALSO BUILT BY AUSTRIAN BRANCH, ALBATROS WORKS, O.A.W. (OESTERREICHISCHE-ALBATROS-WERKE, G.m.b.H.) VIENNA.

AIR AGE INC. 551 FIFTH AVE. NEW YORK 17, N.Y.

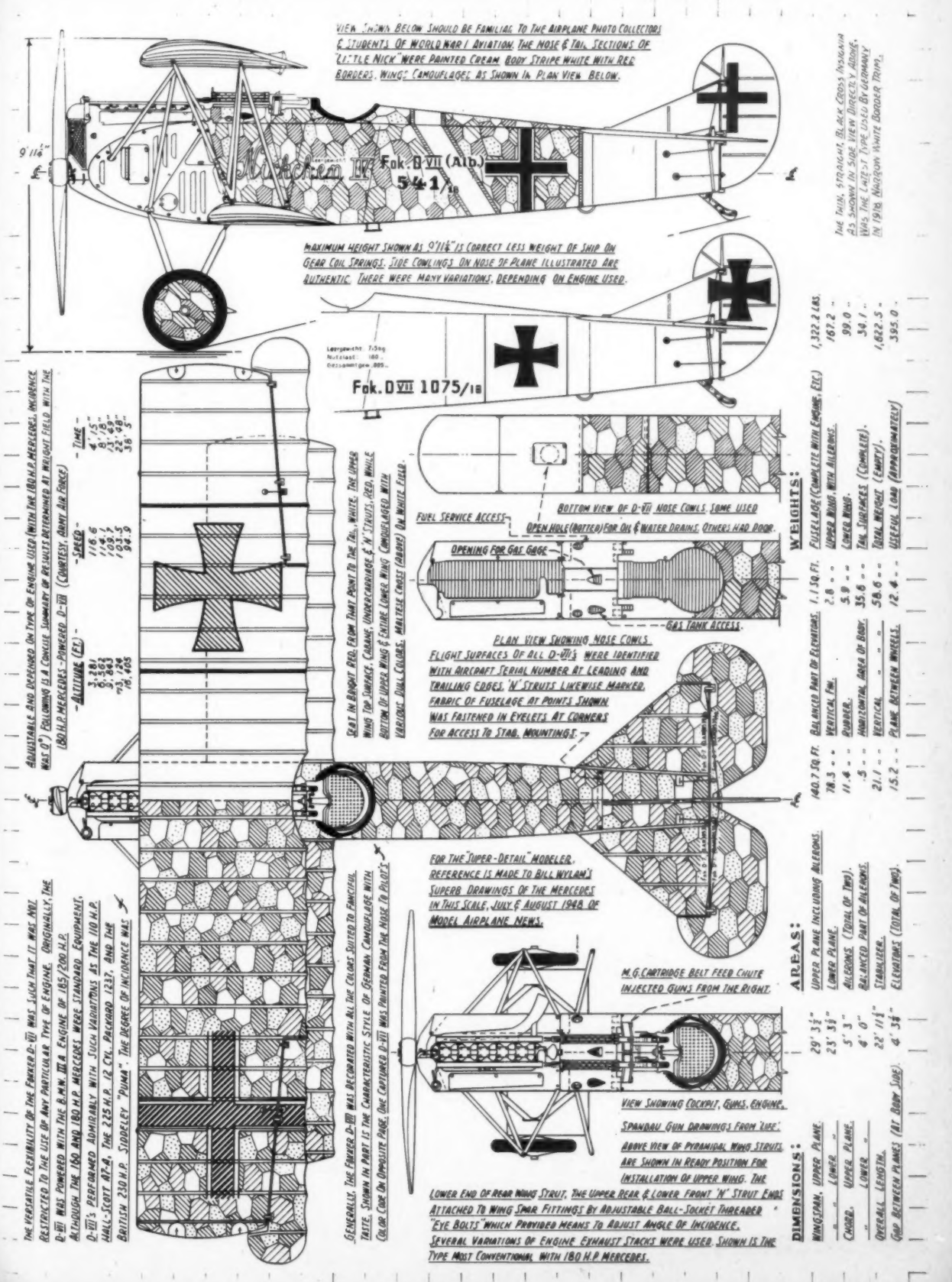
SCALE: ¾" 1'-0"

FULL SIZE: ¾ 1'-0"

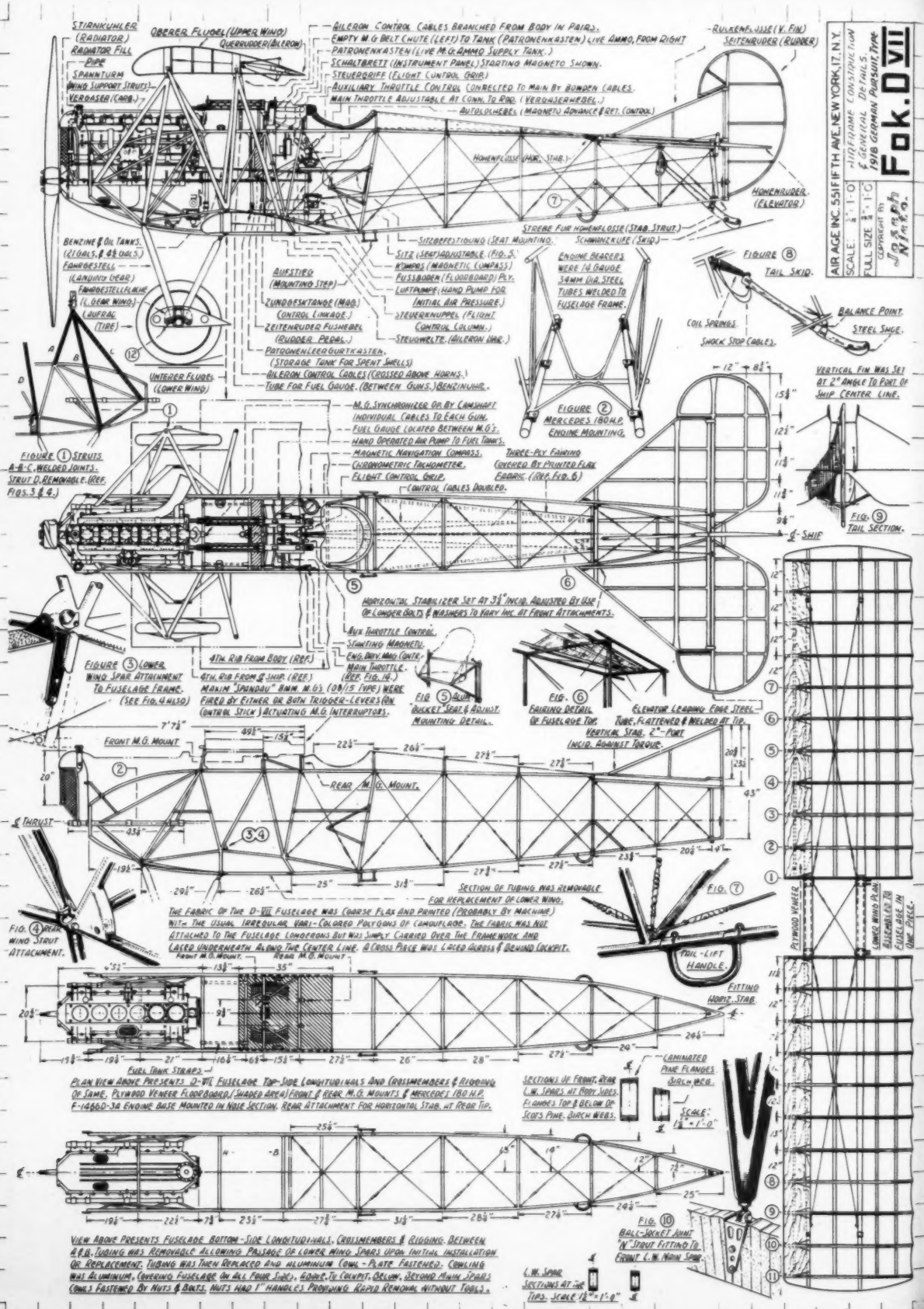
GENERAL ARRANGEMENTS. 1918 GERMAN PURSUIT KAMPF-DOPPELDECKER

Fok. D VII

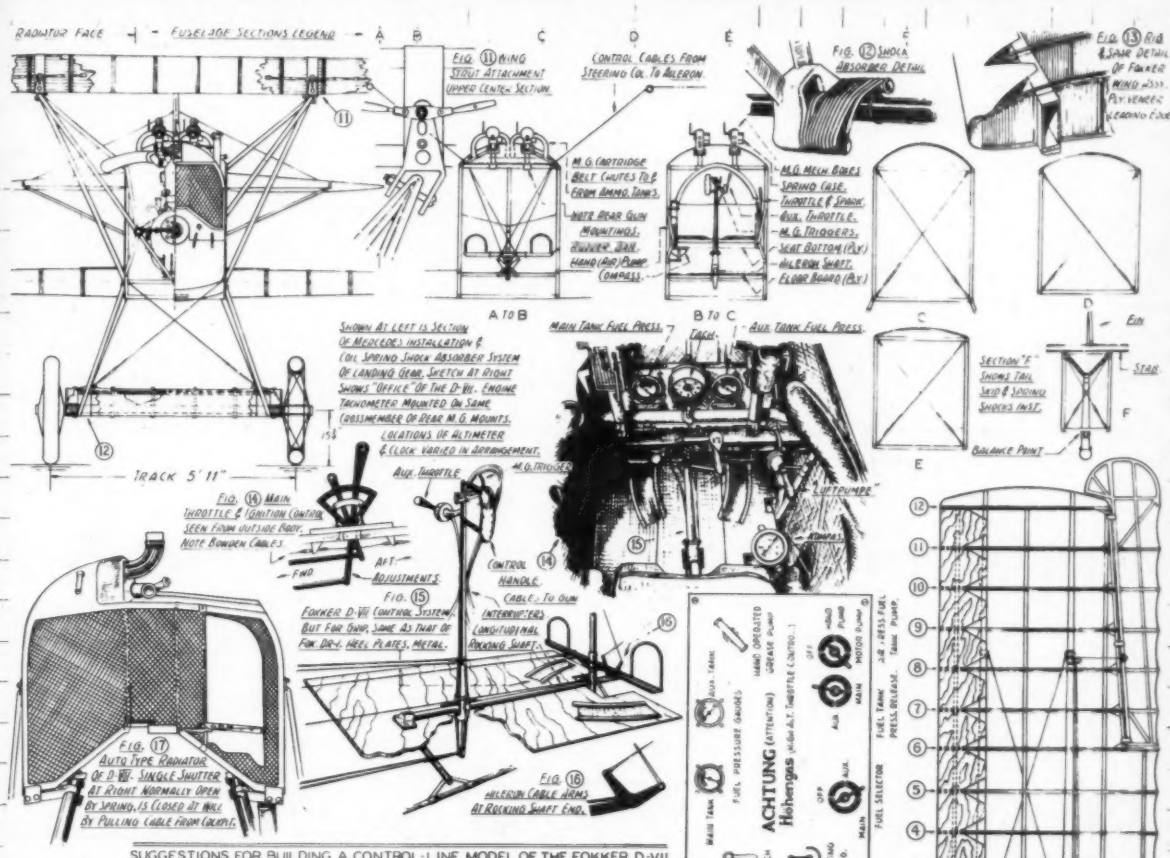
published in the August and September MAN, 1951. These four plates are reprinted.



Numerous requests for plans of the historic ship make the D-7 an all-time favorite.



These detailed drawings of the famous warbird are a collector's item. Save them!



You'll never see this again—take-offs abolished. This is second place winner, Westhampton, 1954, flown by Lanfranchi, Switzerland.

Designs for the New F.A.I. Rules

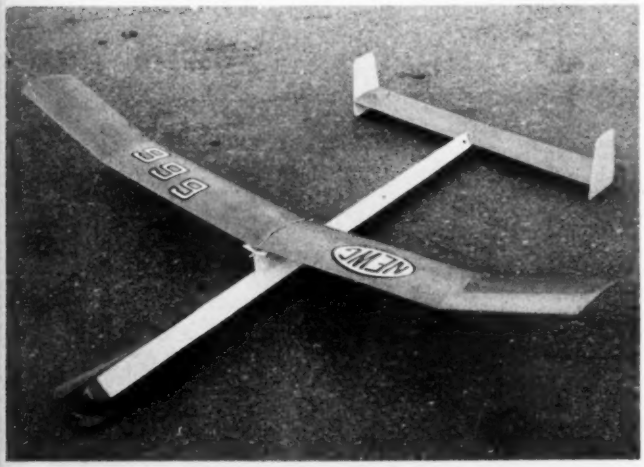
► After a long period of confusion and indecision The FAI Model Commission has finally announced the rules governing International Competition during 1957 and 1958. It is not the purpose of this article to debate the wisdom of these changes or the methods of the FAI. Good or bad, they are the rules—so let's take a closer look at how they will effect design.

A full report on the rules was published in the February 1957 issue of Model Aviation (For AMA members), so we only briefly will review them.

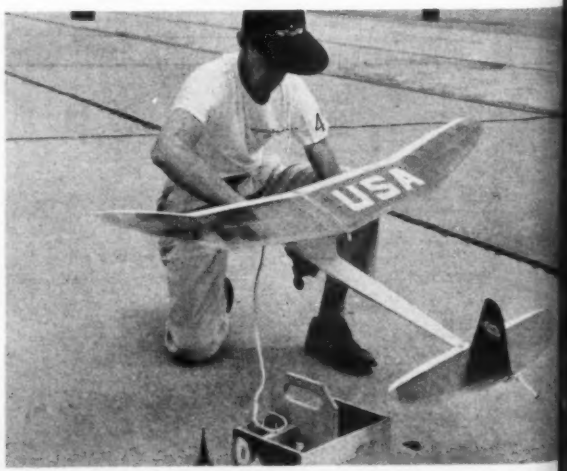
1.) The take-off requirement has been abolished, effective January, 1957.
2.) For FAI Power Models:
    a.) Power loading is increased to 173.4 ounces per cubic inch of engine displacement.
    b.) Combined surface loading is increased to 4.55 ounces per 100 square inches.
3.) For Wakefield Models:
    a.) The total weight of the rubber motor, including lubricant, has been reduced to 50 grams, (1.76 ounces).

Even a casual glance will show that these changes will decrease performance. However, a little work with the slip-stick shows that things are not as bad as they seem. Past history has proved that the model builder always seems to develop better airplanes, despite tighter restrictions. Constant advances in technique and design have produced excellent models under the 1954-56 rules. New and more powerful engines will offset the increased loadings somewhat, although the rubber boys have their work cut out.

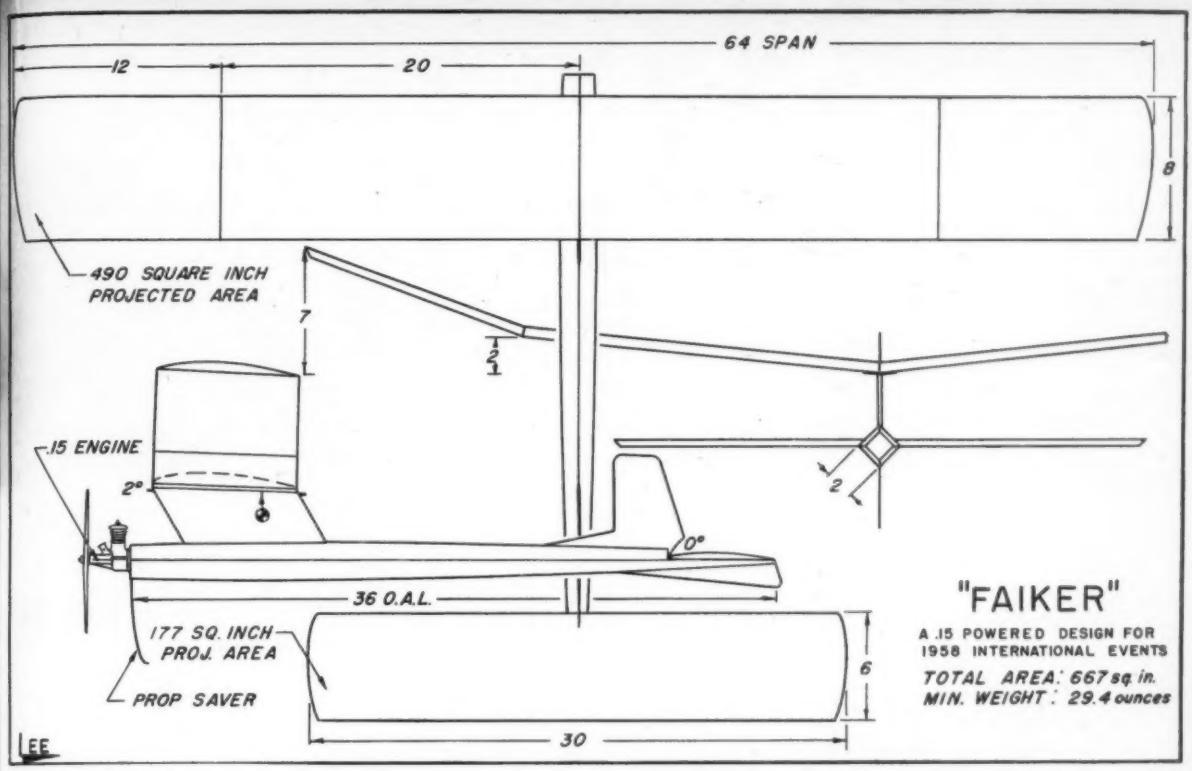
All the moaning and groaning which ensued when rubber weight was reduced to 80 grams disappeared when the new models were flown. Certainly, the model was more reasonable to build and handle, while performance approached that of the unlimited rubber ships. Again, the drastic reduction in Nordic line length to 164 feet has been survived. Today's models are approaching a true dead air time of three minutes. (*Continued on page* 53)



Somewhat smaller craft is New England Group's concept new-rules Wakefield built 50 grams rubbber weight—22% of the gross weight.

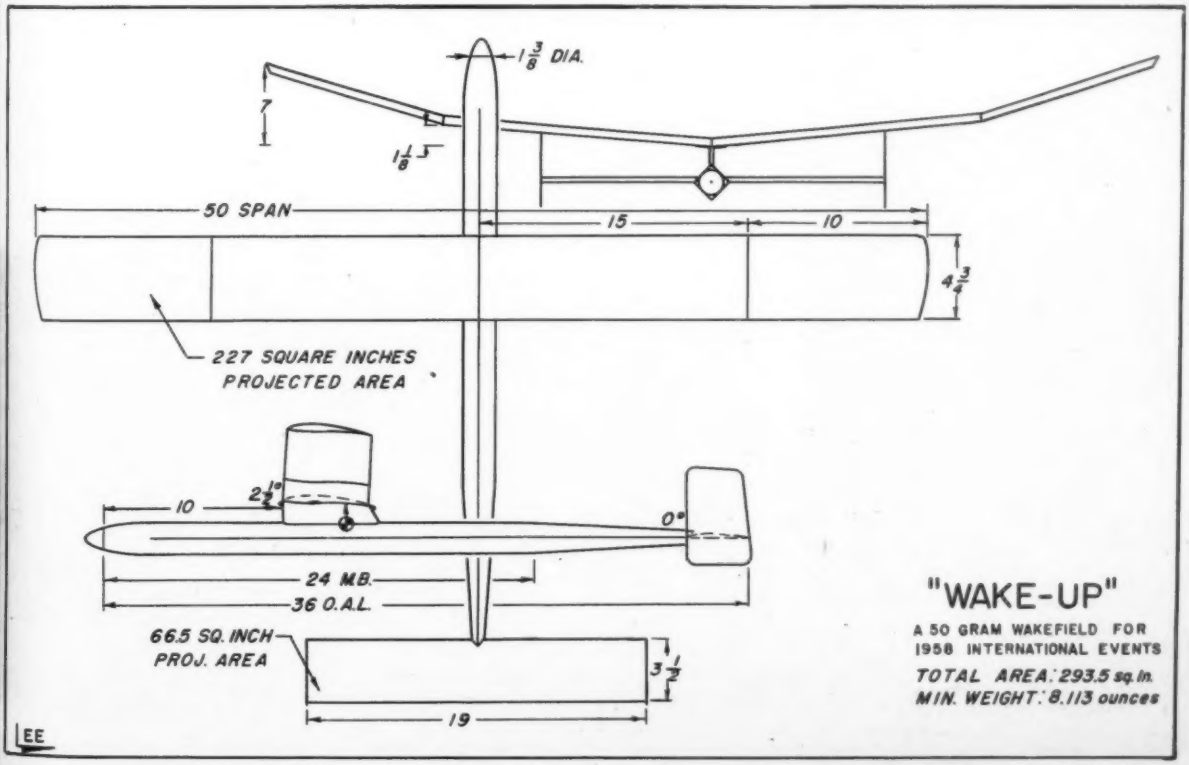


Skyrocket climb dramatized by Dave Kneeland is a thing of the past. Higher loadings put the coming FAI gassies in near payload class.



by LEE RENAUD

On August 18th, the eliminations for Wakefield and Power teams for the International events will be held. From the New England Group comes this analysis of what to build and fly. Above is a .15 powered gassie, and below the new look in Wakefields. Let's get with it!



P. G. F. CHINN

FOREIGN NOTES

A monthly world-wide round-up of technical developments, designs, significant industrial products.

South Africa

► One of the biggest things to happen in S.A. modeling was the recent visit of Howard Bonner and Bob Palmer. There is no doubt, of course, that present American standards in multi-control RC flying have no equal anywhere else in the world and South African modelers thanks go to Jix (Pty) Ltd., of Pretoria and Durban, for arranging the demonstrations, as well as to the distinguished visitors for showing 'how to do it'. Jix, leading hobby dealers, also sponsored the recent S.A. Nationals, the first time that South African modeling has received commercial support on such a scale.

Australia

After a lapse of several years, during which time no Australian model magazine has been published, 1957 opened with the simultaneous appearance of two brand new mags. Unfortunately, neither publisher apparently knew of the impending appearance of a rival, which means that both will need the utmost cooperation from Australian modelers to keep the ball rolling. One of these papers, the 24-page *Australasian Aeromodelling*, published monthly in Victoria and intended to cover both Australia and New Zealand, is edited by Bob Rose, former secretary of the Model Aircraft Association of Australia, with the assistance of model fliers Derry Brown and John French. The other mag, *Model News*, published in New South Wales, is run by two well-known Australian modelers, Adrian Bryant and Russ Hammond.

Australian U-control seems to be running into a lot of trouble with noise complaints. Most enthusiasts favor .29/.35 glow motors and whenever a strong group reaches proficiency, complaints almost inevitably result in a ban on flying in local parks, etc. Everything has been tried, including the hiring of a lawyer to present the modelers' case, but, apparently, with little or no success thus far. We can only suggest that, if noise really is the main source of complaint, another try with exhaust mufflers is surely the answer. Few modelers favor the idea of a muffler, but this is only because it really has not been given a proper try. How about it, manufacturers?

Japanese rubber champ, Toshio Sato, with beautiful Wakefield. The Saemann influence?

Great Britain

Phil Smith, one of Englands most prolific model designers and the originator of ducted fan scale kits (latest is of the delta-wing 1132 mph Fairey FD.2 world record holder) has just introduced a new and improved type of impeller fan. Commercially known as Veron 'Imp', the new fan, unlike ordinary metal fans, is built up, using fiber blades in a wooden hub. At present available in five sizes to suit motors of from .049 to .19 cu.in., each fan has twelve curved blades bonded and pinned into very tight slots in a laminated wood hub. The back of the hub is recessed, thus leaving sufficient shaft threads to enable the aluminum starting pulley to be added between the fan and prop nut. We hear that AHC should have these fans available shortly.

Frau Edith Denzin, wife of Germany's noted designer, Karl-Heinz Denzin, with their 1957 A2 model.

New type impeller for ducted fan installations. British, it uses fiber blades in a wooden hub.

We have lately been doing prototype horsepower tests for the manufacturer on a new English engine. This is the P.A.W. Special 2.49D, built by Progress Aero Works, who are widely known as the manufacturers of Trucut props. The P.A.W. Special is a .15 cu. in. contest Diesel with shaft valve induction and a single ball bearing and is intended to attract International class free-flight and team-racing enthusiasts. Competing in the same class as the Oliver Tiger, the P.A.W. will be a limited production item and will sell at £6. 10. 0. ($18.20). The motor has an excellent performance over a wide range of speeds up to 16,000 rpm and our best test example gave nearly .30 bhp at 15,500 rpm.

Italy

The Italian contest season was due to open June 1-2 at Florence with the *Coppa Supertigre* for FAI .15 cu. in. speed. The results (which we hope to give next month) should be interesting, promising a renewal of the struggle between last year's surprise performer, the roller bearing Barbini B.40TN and the brand-new Super-Tigre G.30. We have one of the first of these latter on the way from Italy.

West Germany

The national contest rules of most Continental European countries have, in the past, followed FAI model specifications closely, but we hear, on good authority, that Germany may break with that tradition when the new 1958 FAI free-flight rules come into effect. In common with those of many progressive modeling countries, the contest modelers of West Germany are against the FAI rule changes and it is said that German rules will remain as at present, with the exception that a 12-second motor run will replace the 15-second rule.

After some delay (the engine was first mentioned a year or so back in this column) the WAF .21 cu.in. Diesel is now in production at Walter Fritsch's machine shop in Berlin. A Series-2 version of the Webra Mach-1 Diesel is also now being produced, having a plastic rotor in place of the aluminum one previously used. There is a rumor that the Auto-Knips timer fondly remembered by old-timers (no pun) will appear in a special version for model planes.

East Germany

April issue of the new East German model magazine *Der Modellbaur* carried an article making some remarkable claims for a new type of jet motor. The engine is the invention of one Comrade *A. Prill* and this had prompted a waggish East German correspondent to pencil a cryptic marginal note:

(*Continued on page* 44)

FOR TOP POWER*formance*...

FLY WITH

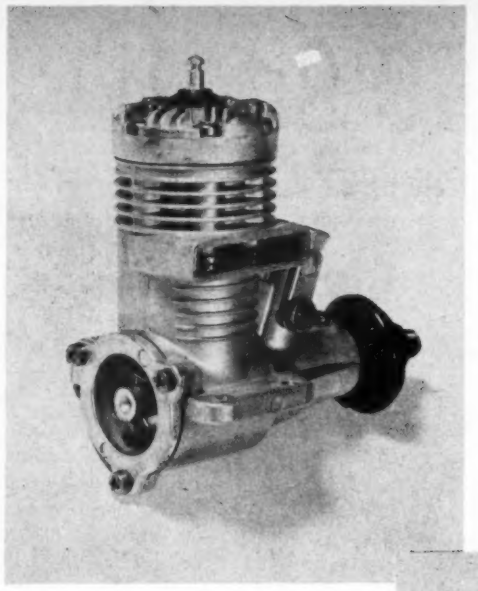
TESTORS "39" ALL PURPO FUE

QUARTS: $1.50

...available in quarts, pints, half-pints, and quarter-pints to give you exactly the container size you want for every purpose!

It's a proved fact that Testor's "39" gives engines the very best possible all-around performance . . . in stunt, contest, and just-for-fun flying! See for yourself on any basis of comparison you prefer. Check it for easy starting . . . all-weather performance . . . power output . . . quality and quantity of lubrication. You'll agree that Testor's "39" makes flying more fun . . . gives you the dependable operation you want under every flight condition. It's a safe fuel, too . . . formulated to protect your engine and insure you more hours of enjoyable, satisfying flying time. Reasons a-plenty why Testor's "39" *now outsells all other fuels.* You'll find the familiar red, yellow, and blue cans at dealers everywhere . . .

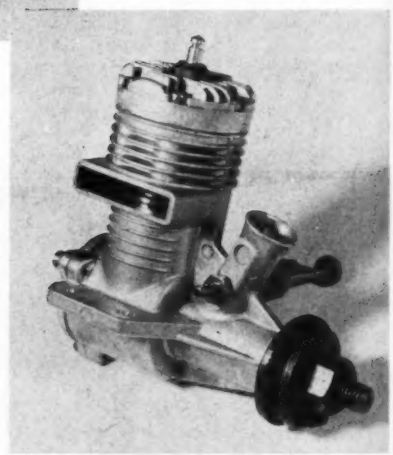
TESTOR CHEMICAL COMPANY • ROCKFORD, ILLINOIS



Engine Review

by E. C. MARTIN

Fox .25



Provision is made for easy two-speed installations or a 29R pressure feed can be added.

One of a new series of engines, the Fox .25 may look familiar, but it introduces a number of new finepoints.

► There is no doubt that the basic Fox 29 design formula has over the years proved itself peculiarly suited to the requirements of control line aerobatics. True, many other engines share the glory, and yet it is more than coincidence that so many closely resemble the Fox in basic design. It can be justly argued that model engines are such simple things that inevitably they must closely resemble one another, and yet despite this fundamental simplicity we seldom see a new engine appear that does not embody some new development, some new refinement of detail that gives it the slight edge to warrant its introduction, and the result of this constant change, so gradual we hardly notice it, is the vast difference between the engine of today and that of ten years ago.

In the course of development work on the larger .35 with a view to using very high compression ratios, the behavior of the various stressed components of the engine was examined during the application and removal of loads similar to those anticipated from high-cylinder pressures. During each cycle of the engine the forces trying to separate the cylinder from the crankcase rise from a slightly negative value to a very high positive figure when the piston is at top dead center. At this point, when the combustion chamber volume is at its smallest, there is very little of the cylinder wall exposed to the pressure from which the force is derived. The area of the piston crown and cylinder head, however, remain the same at all times. Since the direct force acting on any one component is proportional to its area exposed to the pressure, it will be evident that at Top-Dead-Center the actual disposition of stress will try to burst the piston crown and cylinder head, whereas the cylinder itself will not be sustaining much bursting stress but will be very busy keeping the head anchored, in effect, to the crankshaft bearing, and therefore be

(*Continued on page* 55)

10¢? YES SIR, WE SAID 10¢

FOR YOUR "BREEZY JR." KIT WHEN YOU BUY THIS COMBINATION R/C PACKAGE!

THIS UNBEATABLE VALUE TO INTRODUCE YOU TO THE REAL FUN OF CONTROL FLYING!

You can't afford to miss this R/C deal! An airplane, transmitter, receiver and escapement in *one package* and all with guaranteed Babcock *quality* and *reliability*.

COMPLETE KIT CONTAINS

- Breezy Jr. 1/2A, R/C Kit
- "Magic Carpet" Receiver Kit
- "Magic Carpet" Transmitter Kit
- "Mark II" Super Compound Escapement

DESIGNED BY DICK SCHUMACHER
The INCOMPARABLE "Breezy Jr." has a 42" wing span, uses .049- .09 engines

Priced Separately
$ 6.95

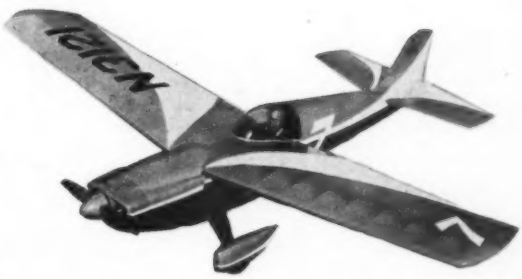
ALL FOR $ 49.95
$ 59.95 with assembled radios

"Breezy Senior"

FULL COMPETITION SPORT PLANE

Offering a completely *NEW* concept in Sport and Competition flying. Only hi-quality materials are used. Wood parts are of precision die cut balsa and plywood. Cowl, hatch, wing tips, wheel pants and rudder fairing are in Super Hi-Impact plastic. The full canopy in clear plastic and metal landing gear are *PLUS* features. Complete plans show controls for elevator, rudder, engine and brakes providing for *winning performance* both on the ground and in the air.

$ 14.95



DESIGNED BY CHUCK HOLLINGER
Single or multi-channel
56" Wing Span, .09- .23 engines

SIZE 6 7/8" x 2 7/8" x 2 7/8"

"MAGIC WAND" TRANSMITTER

LOW PRICE and HI-QUALITY combine in Babcock's BCT-10 to make it today's most wanted transmitter! Don't let its small size fool you! It is as versatile, dependable and easy to handle as most high priced equipment. "QUICK LACE" means just that — the coil, condensers, resistors, etc. lace through eyelets in the pre-assembled chassis and are quickly soldered. It's really EASY and FUN to assemble this complete kit. Regular size batteries insure long life.

BCT-10 TRANSMITTER 27 MC

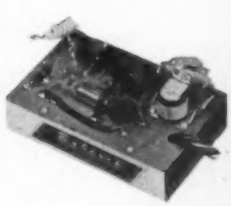
27 MC "QUICK LACE" KIT	$ 19.95
FACTORY ASSEMBLED	$ 24.95

"MAGIC CARPET" RECEIVER

Companion to the "MAGIC WAND" the "MAGIC CARPET" receiver features Babcock's new "TRANS-FLEX" circuit. Two transistors, a crystal diode, 1AG-4 tube and the BR-3 Relay work in a reflex circuit to give unmatched range and fail-safe performance. Long life battery complement consists of one 30V hearing aid and one pen cell. Installed weight of receiver is 2 ounces — 4 ounces with batteries. "QUICK LACE" type, like the transmitter, it laces together in just minutes.

BCR-10 RECEIVER

"QUICK LACE" KIT	$21.95
FACTORY ASSEMBLED	$26.95



SIZE 2" x 3" x 1 3/4"

Babcock MODELS, INC.

1640 Monrovia Avenue, Box 344, COSTA MESA, CALIF.

International News

(*Continued from page 2*)

There will be no special flying order or rounds, but each entrant must complete two flights by the half-way point of the time allowed for the event. Flights not completed within the limit will be lost.

QUALIFICATIONS FOR SEMI-FINALS
POWER—11½ minutes or the top 20%
WAKEFIELD—12 minutes or the top 20%

ELIMINATION REQUIREMENTS

Local eliminations may be held in any city where 15 entrants are guaranteed. No fewer than 15 will be allowed. Eliminations will not be considered official if less than 15 persons are entered.

All who enter the Eliminations will be required to abide by the following, and by virtue of their entry, it will be considered that they do assent. "As a duly entered contestant making. an official flight, I hereby agree that if I am selected as a team member, I will agree to either compete in person or allow my models to be flown by proxy. I also agree to make a sincere attempt at preparation, and to cooperate in all matters concerning my entry in the finals."

ELIMINATION SITES

Local Eliminations will be held in the following cities on August 24-25. Names and Addresses of Contest Directors will be made next month but in most cases you may use the Nordic Eliminations Contest Directors as a guide.

California: Los Angeles, Sacramento, San Diego, Santa Barbara. *Florida:* Miami. *Illinois:* Chicago, Galesburg. *Indiana:* Bloomington. *Kansas:* Wichita. *Maryland:* Baltimore. *Massachusetts:* Boston. *Michigan:* Detroit. *Minnesota:* Minneapolis. *Missouri:* Kansas City. *Nebraska:* Omaha. *New York:* New York-Philadelphia. Watertown. *New Mexico:* Albuquerque. *Ohio:* Cleveland, Columbus. *Oklahoma:* Tulsa. *Tennessee:* Knoxville. *Texas:* Dallas. *Utah:* Salt Lake City. *Virginia:* Norfolk. *Washington:* Seattle.

MAN at Work

(*Continued from page 7*)

centers. Sponsored by the El Cajon Exchange Club, the association is open to other clubs who would join the fun; so far there's two: El Cajon Modelaires, and San Diego Airliners. (Info: H. R. McIntire, 4532 Olive Ave., La Mesa, Calif.) . . . new slant on professionalism, John Rowland, Denver. Sez he, ". . . professionals do not exist in model airplane field —stunt, RC, FF or any other. Sure, these guys make equipment but where do their ideas originate? From us run of the mill joes that the "pro" mixes with at Sunday flying sessions. If he stops showing up, the only way we'll get compound escapements and servos will be to build them ourselves. . . Mike Cook, Hamilton (Ohio) Aero Club, telling us about big contest June 23, says the boys do their flying on a 35-acre site, with no company except cows. Cows can be some company, this country boy attests. Club has big ideas and plans but only 13 members. Free flight fans should be hot after this one. Mike Cook, 25 E. Fountain Ave., Glandale, Ohio. . .

Sky Knights Model Plane Club, Spartanburg, S. C., holding Class AAA Meet, probably 17th and 18th of August, cosponsor, the American Business Club of Spartanburg. This will be the best "All-Dixie" yet. Trophies through 3rd place. The Sky Knights meet every Friday night at 7:30 in a room behind the Hobby Shop. Variety of activities planned, such as movies, instruction classes and business discussions. About 40 active members.

Fly each Sunday at our flying field at Camp Croft. Fly almost all events each Sunday; most popular are combat, stunt, hand-launched gliders, and most classes of free flight and R/C. Sometimes speed ships and jets. Hope to pave several circles. Sky Knights Model Airplane Club, 138 Morgan Square, Spartanburg, S. C.

• • •

► Tom Howard, Izee Route, Canyon City, Ore., says John Day Model Club, John Day, Ore., has 16-man club, interested ukie, RC, some FF. . . Did you hear about Howard Bonner and Bob Palmer barnstorming through Africa? Demonstrations of US top RC and stunt went over big. Crowds of thousands welcoming planes, getting guys out of bed at crack of dawn, mobbing the flying fields. Must have been something. . . See you at the Nationals?

• • •

► As we go to press, receipt of FCC Docket 11994—Rules Governing Citizen's Radio Service and Reallocation of the ranges 26.96—27.23 from the Amateur Radio Service to the Citizens Radio Service.

Besides 27.255, modelers would be able to use 25.995, 27.045, 27.095, 27.145, 27.195—and, of course, there is 465. June 10 was the deadline for filing of protests. So, this may prove to be the picture, unless "ham" opposite kills it.

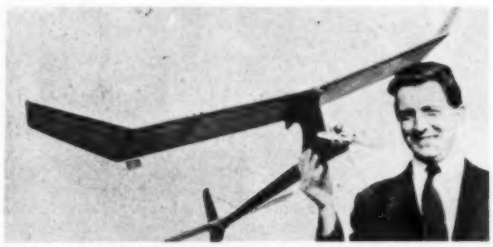
Last January 10, AMA submitted a petition for 27.242, with certain users of 27.255 being shifted to 27.260. FCC acknowledges AMA petition is their docket.

WORLD CHAMPIONS WIN with TOP FLITE and POWERPROPS

and FOR THE 9TH CONSECUTIVE YEAR, THEY WERE USED BY MORE 1ST AND 2ND PLACE WINNERS AT THE NATIONALS *THAN ANY OTHER MAKE!*

• *SUCH POPULARITY MUST BE DESERVED . . . and we think it is!*

We at Top Flite make no "claims", we let PERFORMANCE establish the FACTS about prop superiority. Every TOP FLITE and POWER PROP is precision made, finished to streamlined leading edges . . . thin trailing edges, individually balanced and lacquered to give aerodynamic efficiency and the kind of CHAMPIONSHIP PERFORMANCE that has been established and known throughout the model world! So Fellas . . . whatever your choice: Radio Control, Free Flight, Speed, Stunt, Payload, Scale or Sport Flying . . . there's a Championship Prop of the size and pitch best suited to your engine and plane! TOP FLITES and POWER PROPS deliver more pull per flight . . . more flights per prop!



1956 WORLD POWER CHAMP

Ron Draper at Cranfield, England in October 1956, won the World Power Championship Meet known as "The Model Olympics". His victory over the best model flyers from all over the world is indeed an achievement. There were 5 official flights under FAI rules. In winning this coveted world title his total elapsed flight time was 20 minutes, 20 seconds. We congratulate Ron Draper and are truly proud that a TOP FLITE 8-3½ PROP was used!

1956 WORLD MODEL ENDURANCE RECORD

Pictured are (l-r) Phil Garrard, Charley Burnett, Dick Williams and Keith Lynn, the 4-man team working in half-hour shifts, who established a new world record for continuous flight of 34 hours, 34 minutes. A Johnson 35 engine and a 10-6 TOP FLITE PROP were used.

YOU'LL FIND A TOP FLITE OR POWER PROP FOR EVERY FLYING REQUIREMENT

TOP FLITES
Dia. and Pitch: 6-3, 6-4, 6-5

POWER PROPS
Dia. and Pitch: 4½-6, 4½-7, 5¼-3, 5¼-4, 5¼-5, 5¼-6, 6-3, 6-4, 6-5, 6-6 **20c ea.**

TOP FLITES
Dia. and Pitch: 7-3, 7-4, 7-6, 8-3½, 8-5, 8-6, 8-8, 9-4, 9-5, 9-6, 9-7, 9-8, 10-3½, 10-5, 10-6, 10-8

POWER PROPS
Dia. and Pitch: 7-4, 7-6, 7-8, 7-9, 7-10½, 8-4, 8-5, 8-6, 8-8, 8-9, 8-10½, 9-6, 9-8, 9-9, 9-10½, 9-12, 10-6, 10-8 **25c ea.**

TOP FLITES R/C
Dia. and Pitch: **11-3***, 11-4, **11-5***, 11-6, 11-8, **12-3***, **12-4***, 12-5, 12-8

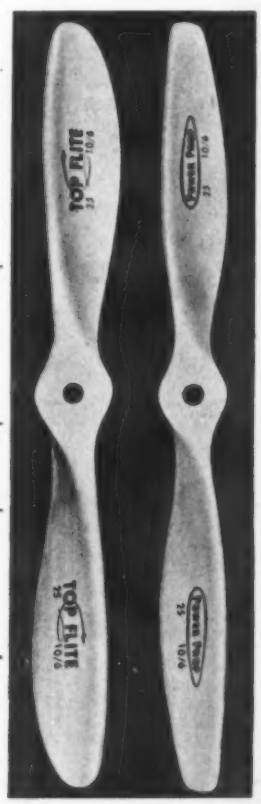
POWER PROPS R/C
Dia. and Pitch: **11-3***, **11-4***, 11-6, 11-8, **12-3***, **12-4*** 12-6, 12-8. **35c ea.**

TOP FLITES R/C
Dia. and Pitch: 13-5½, **14-3***, **14-4***, 14-6. **40c ea.**

TOP FLITE P-L-A-S-T-I-C PROPS
Molded, durable, mar-proof plastic that is also hot fuel proof. Gives longer life, makes engine starting easier.
Dia. and Pitch: 5¼-3, 5¼-4, 6-3, 6-4. **15c** ea. *Dia. and Pitch:* 7-3*, 7-4*. **20c** ea.

NEW! TOP FLITE NYLON PROPS
Will outlast any other kind almost 50 to 1, reducing cost per flight to the absolute minimum. *Dia. and pitch:* 5¼-3, 5¼-4, 6-3, 6-4 **25c** ea.

*New *Dia. and Pitch:* 7-3, 7-4 **35c** ea.



• *get a new, up-to-date FREE PROP CHART at your hobby headquarters or write us direct.*

• *made by makers of famous "Jigtime" and "Superform" Kits.*

TOP FLITE

TOP FLITE MODELS INC.
2635 S. Wabash Ave. — Chicago 16, Ill.

The Wrecktangle

(*Continued from page* 18)

wing from the plan, crack at the dihedral notches and block up each tip for the 3¾ in. dihedral. Cement the joints well and add the center rib. Then fit the upper spars and add the leading edge sheeting. Add the landing gear retainer (10) as indicated in the wing drawing.

Bend the landing gear to match the detail. Remember to slip the aluminum tubing over the wire before bending. It doesn't go around corners very well. Notch out the front of two wing ribs to take the tubing. Insert the arm of the gear into the hole in the gear retainer (10) and cement and bind the tubing to the wing leading edge. The wheels are held in place by washers soldered to the axles.

The fuselage consists of two slab sides separated by rectangular formers and covered top and bottom with sheet balsa. The eyedropper tank is installed before covering the top and bottom. Or you can use a timer and your favorite tank system. Solder the engine mounting nuts to a piece of shim stock or tin can metal and cement to the aft side of the plywood firewall before installing the firewall.

The wing fairings are carved to match the wing dihedral angle. Carve two rudders from ⅜ in. sheet balsa to the section indicated.

Japanese tissue was used for covering on the original models but Silkspan will do as well. Cover the fuselage and rudders as well as the wing and elevator. A little care will be required where the landing gear leg extends through the bottom of the wing. Make a razor blade slit in the paper and slip it forward around the wire. Then start doping the paper to the structure. After spraying the surfaces with water to tighten them give five coats of clear dope.

Cement the rudders to the elevator and add the hook and dethermalizer wires to the elevator and the fuselage. Add the fairing block shown, to the center of the elevator. This acts as the stop for the pop-up type dethermalizer.

The canopy adds fin area forward. It was made from quarter inch sheet balsa on the original model but if desired a plastic canopy of approximately the same size will do as well and be more realistic.

Now give the entire model two coats of fuel proofer. Install the engine, making sure that the mounting bolts are long enough, but do not push against the eyedropper when in the tightened condition.

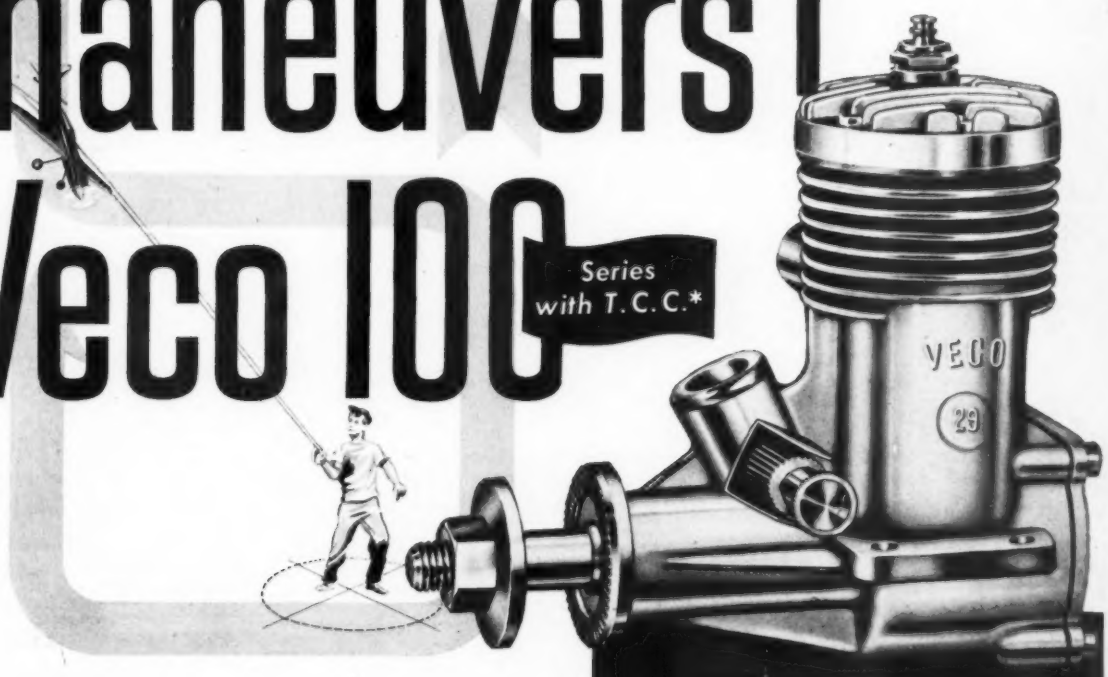
The wing is held in place by rubber bands around the entire fuselage. The tail rubber band goes from the top hook forward and around the fuselage bottom and then back to the hook. This will raise the tail for dethermalizing when the rubber band around the aft wires is burned through by the fuse.

The original models flew right off the drawing board. No. 7734 was built by the author and 3350 was built by Carole Mooney, his wife. Both climb in very wide left circles and glide to the right. A tighter left circle under power has been tried and is safe, but don't let the model go right under power. It has a tendency to spiral dive to the right.

Test glides are in order in initiating your model to the air. Hand launching is easy and the glide should be flat and floating with little noticeable turn. Limit the first power runs to 5 to 7 seconds and correct any violent turning tendencies with thrust line adjustments in the direction opposite the turn. When trimmed out correctly this model should climb almost straight or in a wide left circle at about a 45 degree angle and quite fast.

built for today's maneuvers!

Veco 100 Series with T.C.C.*



.19 **11.95** .29 **15.95** .35 **15.95**

see VECO'S other engines at your hobby shop.

famous VECO TCC engines for durability · economy

Here are the rugged power plants you have been waiting for to meet the rigid requirements of the new AMA maneuvers. The new "100" Series **VECO** Engines will take you through consecutive vertical square eights with no strain or sag. Rapid acceleration and constant power output make these engines a must in Team and Rat Racing. In fact, with one of these beauties you can't get anything but satisfaction. Advance carburetion, improved cooling and other design improvements combined in this Series make it the newest type of model engine power—**VECO** Power—never before obtained.

If you question our claims, see what the British had to say about the **VECO** ".19" in the February issue of their "Model Airplane" magazine.

Available in the three most popular displacements ".19," ".29," and ".35." Ask to see them at your local hobby dealer's.

*Temperature Controlled Clearance

VECO Products Corporation, Burbank, California

Breathless

(*Continued from page* 14)

Also cement the dowels for the wing, landing gear and tail mounting in place.

Now you can add the reinforcing "skin doublers" to the sides, forward of the firewall, put in the landing gear braces, and cement the reinforcing gussets in place where the wing and forward access hatch are located. Finally, cover the top and bottom with 1/16" sheet balsa, except immediately behind the firewall on the bottom, where ¼" flat is used, since this part takes a beating.

The main landing gear may be made from .050" hard aluminum, or from spring steel wire, whichever you prefer. One-eight inch wire is used for the nose gear.

The wing is conventional, built in one piece using 36" lengths of balsa for the leading edge, spar and trailing edge, and 1/16" sheet for the ribs. Add the wing tip blocks, cut the wing in two at the center and cement the two halves back together with the proper dihedral (5½°) established by the dihedral center braces. Cover the center section with 1/16" sheet, sand, and the wing is ready for covering. If you want a slightly slower model, increase the span from 38" to 46". No other changes are necessary.

The fin rudder, stab and elevators are made from 1/16" and 3/32" sheet respectively, covered with silk. The fin is permanently cemented to the fuselage, and the stab is removable. Experience has shown that this eliminates a lot of repair work when the stab hits a weed or a rock on landing.

Plenty of room is available for mounting any of the commonly available receivers—Deltron, Aerotrol, Citizen-Ship, Babcock, etc. If the Babcock BCR-3 is used, the weight may go up to the point where .074 engine is required (an .09 could be used but it would make a mighty hot performer!). The new Babcock BCR-10 is ideal for this size model.

Mounting is very simple. Make a completely self contained receiver unit, including batteries, on a piece of 3/32 plywood, 2" x 6½", and hold the entire unit in place with two wood screws. Since there aré so many small receivers available, no detail is shown other than the approximate location. The photos show the Deltron; the new Babcock BCR-10 also was used.

Slight wing washout is not absolutely essential, but it improves the flight characteristics. Make sure both panels have the same amount. Warping is easily done over a gas or electric range; hold the wing with one hand under it, closer to the heating unit. The wing will not catch fire if it is not subjected to heat higher than your hand can stand. Twist the wing while it is warm; then have an assistant (probably your wife, sister, or girl friend) pour cold water on it and the wing will "set" with the desired amount of twist. The doped silk has the necessary strength to hold the new alinement.

The rudder and elevator should both have about 15° travel for the first flight. This assures quick and positive control. Later you can adjust the travel to suit your own control taste.

Check your fin alinement, wind up the escapement, start the motor, check your radio operation *with the engine running*, and you're ready for your first flight. Hand launch into the wind, correct any turn with the rudder until you gain altitude, then feel out the control. After you are familiar with the response of the model, take-offs, flying and langings, get to be "old hat" and you'll be stunting before the first day's flying is over. And the performance of this little job will really leave you "Breathless'."

Finishing

The entire model is covered with silk. This adds a lot of strength, and if you lightly sand the silk with ultra fine sandpaper between coats of dope, a fine finish results.

Adjusting and Flying

This model is not critical. It will fly even though the C.G. is not exactly where it should be. However, for peak performance the C.G. should be properly located, and this is easily done by moving the radio unit around until the desired balance is achieved.

Not much need be said about the Babcock BCR-8 465 mc equipment. If you install it according to the manufacturer's instructions there appears to be no inbetween point. If either works or it doesn't. If it works you have no problem. If it doesn't work and you are sure you have installed it properly, check all of your connections to make sure they are sound, and check your batteries and make sure they are delivered rated voltage.

The new Babcock Magic Carpet receiver is a good unit for this model. It is easy to install and easy to tune. I flew Breathless with one of the early models of the Magic Carpet and found the range to be more than ample.

The Deltron receiver is a very neat little package which lends itself to shock mounting in a very small space. The manufacturer's recommended voltage for safe operation is 1.3 volts for the filament, and 42 volts for the B supply. In the case of the filament volts, this should be with the radio turned on. In the case of the B supply, it should be 42 volts with the receiver turned on and the transmitter turned on with the button pressed down. My own experience shows that these are very conservative, and if you maintain this battery supply you are not likely to have any trouble with the Deltron equipment.

Rip Van Winkles?

(*Continued from page* 12)

a few scientifically minded designers with aerodynamic know how, gave the answer: speed and weight. These made the difference. Air reactions on wing, tail, surfaces, side areas in turns, the momentum to climb and centrifugal pull of the airplane's mass in turns, all increased in proportion to the *square* of the plane speed. Instead of flying at eight or ten miles per hour like rubber models, gas buggies hit speeds four or five times faster. As a result, the force of air and weight reactions increase from *16* to *25* times. Any defect in design for stability was magnified proportionally. When side areas were not carefully arranged to center the resulting forces at the center of gravity or slightly to the rear, when dihedral and fin area were not carefully proportioned, or when the line of thrust was not properly located relative to drag and center of weight, spiral dives, spins, rolls, stalls and other unwanted gyrations were the inevitable results.

Like true scientific detectives, fans set out to solve the mystery of stable gas model design. Pet theories of individual designers found dynamic expression in hundreds of grotesque aerodynamic and structural combinations.

Fat bodied planes, thin stick-planes, planes with long or short noses, big tails, high wings, low wings, with various degrees of dihedral, engines high, low or intermediate all contended with perform-

(*Continued on page* 42)

Your R C Fun Depends On Reliability!

Get it with any of these units designed for a minimum of fuss & a maximum of fun

★COMMANDER TRANSMITTER KIT

Over 1,000 satisfied users of this fabulous RC transmitter. One of the finest offered at ANY price Now with new step by step instructions, photo pictorial wiring diagram and pictures. Can be assembled by persons without R/C experience. Uses 3A4 tube in powerful but stable circuit. Kit is complete with tube, crystal and blue hamertone metal case, which may be had either plain or punched and silk screened. Only extras to buy are 3 foot section music wire antenna, and batteries or power pack. (May be used with MC20-250 or Ace 6v p/s) 27¼ mc.

Commander Transmitter, plain case $7.95
Commander Transmitter, Deluxe with punched and screened case $9.95

★COMMANDER RECEIVER KIT

Another fabulous R/C exclusive by Ace R/C. Thousands of users attest to the utter reliability and dependability of this unit. Requires a minimum of fussing and does not need a lot of tuning. Will give you a lot of dependable R/C fun. Complete with 3S4, Gem relay, which may be had with plain or Micro points. All required parts except tuning meter and batteries. 27¼ mc.

With Standard Gem relay $7.95
With Micro Gem relay $8.65
For Custom Built receiver add $5.00.

★COMMANDER INSTA-KIT

Insta-Pak simplifies installation in boats or planes. Receiver and batteries are housed in plastic box 4 5/8 x 3½ x 1½ in. Comes with battery boxes, RCA jack and two plugs, 7 prong plug and socket, and instructions $2.50

★MULTITESTER KIT

A meter with test ranges designed for R/C: Gives 0-5 or 50 ma., and 0-5 or 50 or 250 volts. Simple and easy to wire with pictorial diagram. Aluminum case measures 4 x 5 x 2 inches, blue hammertone finish, it is punched and screened. High grade D'Arsonval meter is used and components measured--accuracy is + or - 2%. Complete with test leads, phone tips, alligator clips. $9.95

★MC100B RECEIVER

Reliable performer. Not fussy as to body capacity. Uses 3S4 tube for long life. Has current change from 2.2 ma to .5 ma on signal. Uses printed circuitry for reliable performance, enabling lower manufacturing costs. These savings are passed on to you. Weight is only 2 ounces with tube and relay Size is 1 5/8 x 2 1/2 x 2". 27¼ mc.
WIRED, TESTED, GUARANTEED, COMPLETE $11.95

★MC250B TRANSMITTER

3A4 tube in powerful but stable circuit has over 2.5 watts input when used with batteries. Green hammertone cabinet 3 x 5½ x 8" to enable use of large size batteries for economy of operation. Only extras required are batteries. Will provide many hours of R/C fun. Once tuned it stays in tune for many operations. Crystal controlled 27¼ mc
WIRED, TESTED, GUARANTEED, COMPLETE $14.95

★ALLEN-BRADLEY 60° POTS

Now the special Allen Bradley 60° pots are in stock in two sizes---100k and 1 Meg. This makes possible stick control without complicated gear box or dial cords for use in Galloping Ghost and other dual proportional systems. Either 100K or 1 M 60° $2.50

COMING SOON---A Stick Control Box for use in the dual proportional systems. Watch our ads.

★BADACO 180MR RECEIVER

The new Badaco 180MR audio tone receiver is smaller than a pack of cigarettes, and its new shape permits it to be mounted in the smallest spaces. Over 3½ years engineering and 10,000 test flights have gone into the circuit to assure you of 100% foolproof operation. Printed circuit plus special construction makes this unit more crashproof than any other yet developed, and receiver tubes, and relay are enclosed spot welded 1½ x 2½ x 2 3/8" aluminum case. It has the simplicity wanted by the beginner, and the dependability demanded by the expert. Extreme range and "locked in tuning" means that once tuned, the BADACO stays tuned for hundreds of flights. Weighs only 3.2 oz. Designed for 27¼ mc AUDIO signal, receiver requires an AUDIO transmitter, such as the Badaco MT listed below. Extremely rugged construction---has withstood power dive from 300 feet!
WIRED, TESTED GUARANTEED, COMPLETE $24.95

★BADACO 180MT TRANSMITTER

Hand held audio transmitter features non-continuous carrier which assures a much longer battery life than formerly possible. While designed as a companion to receiver above, this transmitter will operate almost any audio or CW transmitter available today Uses standard size batteries for long life. Engineered over 3½ years. 27¼ mc.
WIRED, TESTED, GUARANTEED, COMPLETE $34.95

★HILLCREST BATTERY BOXES

The new Nylon and Plastic battery boxes you have been looking for. Made by Hillcrest, they feature floating contacts to insure a positive contact under intense vibration.

2 cell Penlite .45
2 cell Medium .45
4 cell Penlite .95
Flat Pack A---holds 6 pencells .95
Flat Pack B---holds 2 pencells 22½ U15 B's .95
Flat Pack E---holds 4 pencells and 2 22½ Y15 B's .95

Cana., Calgary, Alberta
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ances that usually matched the wits of their creators.

Many tried to emulate Maxwell Bassett's pioneer design Fig. 1, that won all the early contests and set first world records, with high "parasol" wing and low line of thrust. This, in spite of the fact that Bassett's plane was a most erratic flier. It could remain in flight only when surfaces were trimmed to keep the plane nosed up sharply and to "fall off" simultaneously into a continuous turn just before the stalling angle was reached. This resulted in a steep spiral *climb;* some times in successive power and altitude wasting loops. Like all pylon models or "parasol" wing, low-thrust models, it often would spiral-dive or "corkscrew in" unless trimmed for this steep spiral climbing or looping type of flight.

Some designers objected to the Bassett arrangement and later to Goldberg's pylon modifications because they believed that the only stable flight of which these were capable, i.e. spiral climbing, depended on careful critical adjustment.

To prove their contentions these pioneers brought forth many unique designs that demonstrated how the stable consistent flight problem could be solved by proper arrangements of invisible design factors rather than by the visible structural elements; factors such as center of weight, line of thrust, line of drag and center of side area.

Bassett's plane and pylon models had low thrust-lines with high centers of gravity, line of drag and center of lift, Fig. 2. These other designs were arranged with the center of gravity *below* a higher thrust line that was much closer to the line of drag above it. The center of lift still remained comparatively high above the center of gravity but usually less so than in the pylon type. The center of side area was lower and close to or on a line with the center of gravity, Fig. 3.

But, why did this solve the problem and what structural arrangement was required?

First, let us look at force arrangement diagram of Bassett's plane, Fig. 2. With thrust acting forward and drag acting backward above it, a nosing up couple is produced. This tends to nose up the plane under power. As the nosing up angle increases during climb, the force couple developed by the thrust upward and the weight of the plane, acting at the center of gravity, increases with the nose-up angle until it reaches a maximum when the thrust line is in a verticle position, Fig. 4. Here thrust pulls directly upward and airplane weight downward. The force couple produced acts clockwise as indicated by the arrow A. This tends to loop the plane over on its back. The loop will take place and valuable altitude will be lost unless a sideway roll is produced by prop torque, rudder or other means in conjunction with his looping tendency, so that the plane sideslips out of the vertical path. This is precisely how this plane reacts in actual flight.

The high-pylon low-thrust line model has the same general force set-up and performs in a similar manner. In fact modelers who fly this type of plane in contests use this nosing up tendency in conjunction with the side roll or slip to produce a spiral climbing flight, often with contest winning results.

However, the flight adjustment required to achieve these results is critical. More often than not the adjustment is not precise and the plane executes unlooked for gyrations. These may take the form of a series of loops with little gain of valuable altitude or worse, the plane may react to its spiral inducing adjustment with nose down instead of up. Instead of a spiral climb a spiral dive is the result.

In high pylon models this maneuver is abetted by the center of side area (CLA) being considerably above the CG. When the plane turns sharply it skids, creating a high side pressure on wing and body acting inward and a strong outward pull at the lower CG. This produces a force couple to roll the plane inward and thereby tighten the turn. The tighter the turn the larger the rolling-in couple and so the vicious cycle builds up to tighten the spiral dive to ultimate destruction of the plane.

Because these planes turn in remarkable contest performance on occasions when properly adjusted, and because like rubber models they do not involve careful design arrangement, model manufacturers once produced them in large quantities. Many modern model fliers have known no other type.

Now let us examine some of the designs that solved the problem by rearranging the set-up of flight forces.

The first one in 1934 was the KG, an eight-foot span gas job, designed by Charles Grant and built by Joe Kovel. Later a 10-foot version set a world record of more than 64 minutes with ¾ oz. of gas per pound of weight, Fig. 5. This record still stands. The original KG design was patterned like rubber models with large fin, wing on top of the fuselage and low CG. It nosed in on turns. The low CG failed to right the plane due to its low outward centrifugal reaction. When

(*Continued on page* 46)

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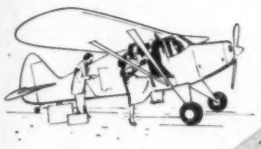

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Santa Ana, California

Foreign Notes

(*Continued from page* 37)

"April-Kohl", in short, nonsense, rubbish or hogwash. . . The claims include a static thrust of 2.8 kg. (6.17 lb.) and the promise of a new world record of 300 km./hr. (186.4 mph) just around the corner. . .

The Prill jet looks similar, externally, to a model pulse-jet, but has no air intake, no valves and needs no pressurized air for starting or electric ignition system. Fuel (gasoline) is supplied from a pressure tank via a needle valve and the oxygen needed to support combusion is generated by the engine itself—by the simple expedient of jacketing the tailpipe and filling the intervening space with a suitable oxygen-liberating compound. (The device is more accurately described, therefore, as a rocket motor.) To start the motor, the jacket is first heated externally. Gas given off escapes through a pipe to the front of the combustion chamber, where it picks up fuel vapor. When pressure is sufficient, a match is applied to the rear end . . . We are informed that a water-injection boost is planned for an improved version . . . Well, that's the story . . .

Japan

Japanese O.S. and Enya motors are becoming firmly established as contest engines to be reckoned with. The success of O.S. in the Australian Nationals has already been mentioned. Now, from one of the season's first contests in Britian, comes the news that the Keil Trophy free-flight team event has been won by a team of four fliers from the Coventry club all using Jap glow motors. Top, third and fourth men used O.S. Max-15's and second place winner used one of the new 15-1B versions of the Enya 15. The remarkable Enya 15-D Diesel, with its easy starting and exceptional power is, as yet, little known, but, we believe, will be keenly sought by European Diesel addicts before the season is over.

In Brief . . .

Australia . . . Len Buck of South Australia is new National Class 3 speed record holder. Flying a McCoy Series 20 powered ship on Monoline, Buck turned in 149 mph. Model had 2 degree forward sweep on wing, pen bladder tank and 8⅛ x 12 prop.

Cuba . . . . After enforced suspension of activity during the recent political rumpus, Havana modelers are now flying again. Cuba has no modeling magazine but Havana's Hobby Center issues some nice bulletins (called Hobbygrams) keeping modelers informed of new items.

West Germany . . . Faller plastics (1/100 scale) are now available with a tiny ¾-in. dia. electric motor to turn prop. Motor runs on 3-6 volts tapping A.C., said to make models especially suitable for model RR scenic effects.

Czechoslovakia . . . We understand that arrangements have been made by the Czech Aero Club to accommodate visitors to the World Championships (August 7 through 12, at an airfield about 50 km. from Prague) at a cost of $5.00 per day. Any intending visitors should apply immediately to the Aeroklub Republiky Ceskoslovensko, Smecky 22, Praha, Czechoslovakia.

Japan . . . . F.100 Super-Sabre is latest addition to range of Eureka super-scale jet-fighter kits for Tiger M-1 pulse-jet (others: F.6, F.94, MiG-15). Will probably sell at around $20 in U.S.

The Fierce Arrow

(*Continued from page* 11)

All dry? Leave it jigged and insert rest of ribs, cementing as you go along. Then slide the rear ¼" sq. spars through ribs starting at root. Then come ¼" sq. main spars and ⅛ x ¼" forward spars, cementing well. Again check alinement of section. Forwardmost spars do not carry through fuselage while rest are fitted and cemented into overlapping joints. Incidentally, double cement all joints.

Form engine bearers, landing gear, firewall, and ¼" sheet for nose of fuselage. Bevel leading edge to receive planking. (Outlines shown on plan.) Install nose sides and firewall with gear attached; then the engine bearers, noting that ¼" ply fillers are needed on top to place engine in line with tank. Now the bellcrank plate goes in. Bellcrank and leadouts should be installed next. Cable leadouts are recommended. Bend 3/32" diameter pushrod, noting only one slight offset. Elevator loads are high and a double offset tends to buckle. Beef up a horn and shape elevators—they go on next. Figure out where the planking goes. It's a little tricky. Top planking goes through fuselage only aft of cockpit bulkhead. Bottom goes through all the way up to the firewall.

Planking was applied with Goodyear Pliobond (contact cement) since there are large areas to work. Put on opposite pieces in order top and bottom working from spar forward. Do not use Pliobond on butt joints between planking pieces. It shows through paint. Ordinary cement will do fine. Use plenty of pins and get it stuck down good. Trim flush with inside of root ribs up to firewall. After planking, you can add 1/16 x ¼" cap strips, noting that tip cap (9) is flush with outside of rib. Add and shape tip blocks, add the one-ounce tip weight and leadout tubes.

Rear end is slightly different in procedure. Bulkheads are cemented to planking except #8, using a center line to line them up. No offset is necessary *but* be darned sure it isn't turned in. Add the ⅛ x ⅜" top longeron and sand it to shape for planking. Bottom is ¼" sheet and should be fitted carefully so it lines up. Set #8 in and add trailing edge. Sight top longeron for offset now. Plank rear, starting with inside top piece and proceed from there. While this is drying, add #3 bulkhead, longeron, and plank. Planking fits down inside root ribs and butts at the center line of the airplane. Drill holes for engine and install blind nuts.

The nose needs some blocks to fill in around front so we can get down to a 2" dia. spinner. Bottom is a ¾" piece of firm light wood shaped after installation. Top block is spot cemented and carved to shape. You can take the easy way and leave the engine uncowled if you like. Otherwise, hollow out and open outlets at rear for ventilation. Hold-down consists of a plate nut screwed to a piece of plywood and cemented to the tank cover. With proper keys one screw is sufficient to hold her down. Carve all to rough shape and start sanding.

We covered the entire ship with silk and finished with five coats of half-strength butyrate clear dope with elbow grease between coats. Color was four coats in three colors, but you're boss here. Go as far as you like. Conservative estimates allow you a total of 56 ounces. You should have enough experience to finish up details so we'll not waste your time. We cannot recommend this weight for beginners although flying exhibits no "nasty" characteristics.

We fly the ship on 65-foot lines. After a flight your arm knows you've been work-

ing. CG range indicates maximum rearward location. Don't go behind that. Now comes the sermon. We played with the CG and obtained a full range of characteristics from rock steady and sluggish to red hot pop corners. So, you can adjust response to suit your particular style by moving CG around. Move aft for quicker turns and forward for steady level. Optimum CG will give steady level and smooth response without abrupt changes. A good place for lead is the rear cover of the engine. We pour it in hot and a Fox will hold two ounces.

This here ship is a born winner and the mere sight of all that area with a li'l ole .35 scares most folks. The surprise is that it flies at all, much less 65 mph and it does a beautiful pattern. A final warning: Although wing loading is light like a combat ship, power loading is right on the borderline for the .35's. Therefore, beware of rough handling, particularly on wing-overs. Otherwise it's almost impossible to get into trouble and we'll guarantee a few thrills when you fly your Fierce Arrow.

Rip Van Winkles

(*Continued from page* 31)

the fin area was reduced, and the CG raised *relative* to the center of side area (CLA) perfect stable flights resulted upon every trial). The KG was noted for such flights and was built and flown in almost every country in the world. Fig. 6 shows the flight force arrangement of this plane. (MAN April and May 1935, Pages 18-22.)

Once the importance of the factors of high line of thrust and low C.L.A. relative to C.G. position became apparent, other designs appeared that were even more stable at high speed, such as Armand Vasques's high thrust soarer, Fig. 7; Leon Schulmans' "Wedgy", Fig. 3 (M.A.N. Nov. 1940); Martin Faynor's "Cavalier"; Judson Marsden's low pylon job (MAN February 1937); Thracy Petrides' famous group of small 300 sq. in. gas jobs (M.A.N. June 1937). Henry Strucks' modernized KG (MAN Feb. 1940); Bill Effinger's "Super-Buccaneer"; and many others.

One of the finest jobs that wore out the legs of Armand Vasques, its designer, boasted of a very high downwardly inclined line of thrust and low center of side area. The wing rested directly on top of the fuselage, with fin area low, Fig. 9. The only trouble Armand had with this design was keeping it in sight after it "took-off." It was equipped with drag flaps to bring it back to earth. In his model you see the "latest idea" which Hal Roth so wisely suggested in his article that appeared in the July, '54, MAN.

In spite of the fact that this high thrust idea was presented in MAN August 1934. more than twenty years ago, it is still good because it is basically correct. Fig. 10 shows how high thrust tends to affect recovery from stalls by producing corrective force moments. Fig. 11 is an excellent example of this idea applied to a rubber model. It appeared in MAN June 1935. (By A. T. Daniel)

There is only one possible drawback to this arrangement where thrust is on line with wing. For climb under power, the stabilizer must be set to provide a *down pressure* in order to keep the nose high at climbing angles and thereby overcome the *nosing down* effect of the high thrust. The stabilizer thus provides no lift and bouyancy during climb unless the CG is set so far rearward that the ship stalls when gliding.

(*Continued on page* 48)

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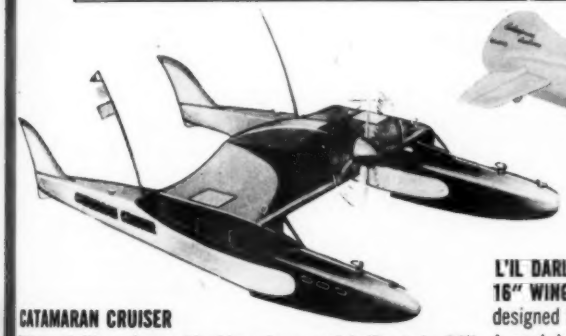

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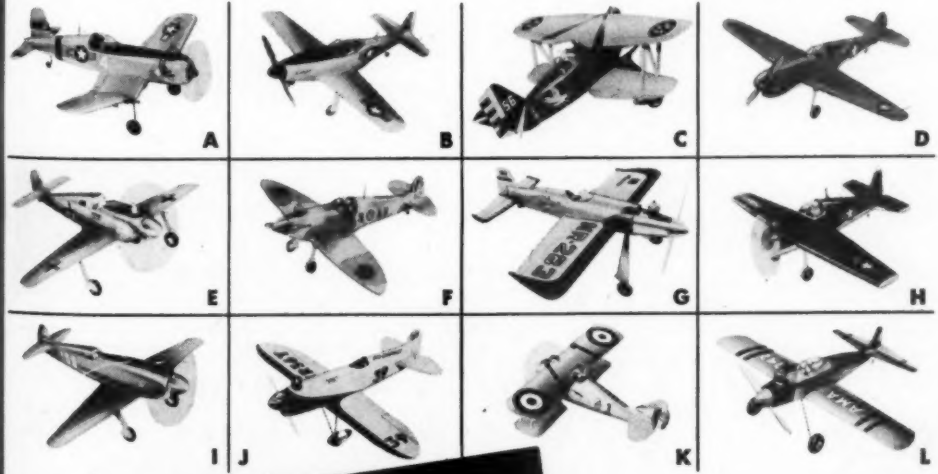

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More finesse in design is indicated by an arrangement that locates the CG and CLA below the thrust line but provides a slightly parasoled wing to bring the line of drag *above* the thust line so as to creat a nosing up effect, with lifting stabilizer, Fig. 12. Under these conditions the nosing-up disturbing drag moment becomes smaller with increased angle of climb while the C.G. swings forward to *increase* the *corrective moment* in proportion with the angle of climb.

Although many of these fine basic design features have lain dormant so many years, it is encouraging now to see that ingenious forward looking model builders are again thinking in terms of design and rediscovering many forgotten but vital principles of stable flight. Congratulations to Hal Roth and others like him.

Contest Calendar

Enter or visit these meets.

JULY

3—*Mitchel AFB, N.Y.* Northeast Conference Model Airplane Contest. Restricted to USAF personnel. Pending.

4—*Ventura, Calif.* Class AA Annual July 4th Elimination Combat Contest. L. W. Cozad, Contest Director, 59 East Main, Ventura, Calif.

4—*Mesa, Ariz.* (A) Mesa Corsairs' Model Airplane Meet for CLS, CLC, CLFS and NC. Restricted to residents of Mesa area. Fred Lind, C.D., 432 So. Wilbur St., Mesa, Ariz.

4—*Lutz, Fla.* (AA) Model Airplane Rodeo for CLS, CLC, RR and scale. W. B. Peaire, C.D., 3604 Bay to Bay Blvd., Tampa 9, Fla.

4-7—*Buffalo, N. Y.* Class AA Third Annual July R/C Meet. Harold C. Keller, C.D., 39 Lorfield Dr., Snyder 26, N. Y.

4-7—*San Bernardino, Calif.* (A) Invitational All Service Model Airplane Meet. Restricted to armed services personnel. John E. Brodbeck, C.D., 14907 S. White Ave., Compton, Calif.

6-7—*Tulsa, Okla.* Class AAA Tulsa Glue Dobbers' 8th Annual Free Flight Contest for FFG, TLG, OHLG, OR, RC, FFFS and PL. Stanley B. Childs, C.D., 6762 E. Haskell Pl., Tulsa, Okla.

6-7—*Burlington, Vt.* Class AAA Vermont State-Regional Championships for CLS, CLFS, CLC, CL, RR, TR, FFG, FFFS, TLG, RC, OR, NC and PL. Fred E. Ashcraft, C.D., Burlington Free Press, Burlington, Vt.

7—*Chicago, Ill.* Class AAA 5th Annual Chicago Prop Nutz Flying Meet for TLG, OR, OHLG, jetex, FFG and RC. Peter J. Sotich, C.D., 3851 W. 62nd Pl., Chicago 29, Ill.

7—*Easton, Pa.* Class AA 5th Annual Air Meet for FFG, OR, OHLG, TLG, RC, CLS, CLC, CL and beauty. Russ Sottosanti, C.D., 1113 Keane St., Easton, Pa.

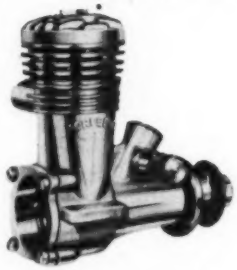
7—*Ionia, Mich.* Class AA Ionia Model Contest for RC, FFG, CLS, CLFS, CLC and TLG. Frank Stanford, C.D., 4501 Magnolia, S. W., Grand Rapids, Mich.

7—*Orangeburg, S. C.* (AAA) 3rd Palmetto Regional Championships for FFG, TLG, OHLG, RC, CL, CLS, CLFS and CLC. Larry Bly, Jr., C.D., P. O. Box 744, Orangeburg, S. C.

7—*Ft. Worth, Tex.* (A) Texas Ratters' Team Racing (C.R.A.) Meet for TR and NC. Restricted to Nat'l. Team Racing Assn. E. E. Scott, C.D., 1409 Arlie.

(*Continued on page* 50)

Torpedo .19 & .35



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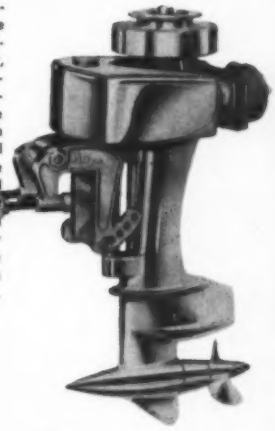

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14—*Evansville, Ind.* Class AA 11th Annual Model Flying Circus for CLS, scale, CLC, CL and RR. H. W. Berning, C.D., 2012 Conlin, Evansville, Ind.

14—*Santa Anita, Calif.* Team Race. Pending.

14—*Dallas, Tex.* Class AA Cliff Model Club 3rd Quarterly Contest for FFG and TLG. William T. White, C.D., 2930 Kingston, Dallas, Tex.

14—*Flint, Mich.* Class AA Flint Balsa Termites' Annual Contest for FFG, OHLG and TLG, Donald Borrow, C.D., 1261 S. Genesee Rd., Flint, Mich.

14—*Friendship Linthicum, Md.* Class AAA 4th U-Control Olympics for CLS, CLC, CL, TR, NC, CLFS, rocketry and clobber. F. G. Stroh III, C.D., RLF #9, Pasadena, Md.

14—*Hartford, Conn.* Class AAA 6th Annual Greater Hartford Control Line Meet for CLS, CLC, CL and NC. Richard Matava, C.D., 47 Stevens St., Avon, Conn.

14—*Reading, Pa.* Class AA Team Racing and Beauty Meet. Charles P. Selin, C.D., 212 Pershing Blvd., Reading, Pa.

14—*Syracuse, N. Y.* Pending.

14—*Wichita, Kans.* Class AA 5th Annual Wichihawks' Control Line Contest for CLC, CLS and CLFS. William H. White, C.D., 603 W. 30th St. So., Wichita 13, Kans.

14—*Bakersfield, Calif.* (RT) Record Trials for free flight gas. Herman Stubblefield, C.D., 114½ Eye St., Bakersfield, Calif.

14—*Portland, Ore.* (AA) Portland Fireballs' Meet for CL, CLS, CLC and RR. Loren L. Schnell, C.D., 5206 N. E. 31st, Portland 11, Ore.

14—*St. Clair Shores, Mich.* (AA) 3rd Annual Emerald Harbor City Air Fair for CL, CLS, CLC and scale. Howard A. Lewis, C.D., 21520 California, St. Clair Shores, Mich.

14 & 21—*Cleveland, O.* 22nd Annual Junior Air Races for FFG, TLG, OR, PL, rocket, NC, CL, CLS and CLFS. Charles Tracy, C.D., Aviation Editor, The Cleveland Press, Cleveland 14, O. Pending.

21—*Tulare, Calif.* Tulare Sky Kings' Record Trials for FFG. Don Peacock, C.D., 912 Apricot, Tulare, Calif.

21—*Ft. Worth, Tex.* CRA Record Trials for all outdoor classes. E. E. Scott, C.D., 7409 Arlie, Ft. Worth, Tex.

21—*Jackson, Mich.* Class AA Jackson Radio Control Contest. David Maricle, C.D., 148 W. Main, Milan, Mich.

21—*Casper, Wyo.* Class AA Oil Capital Model Plane Meet for CLC, CLS, CLFS, RR, proto speed and rocketry. Bill Judge, C.D., 2154 S. Box Elder, Casper, Wyo.

21—*Wilkes-Barre, Pa.* Class AA 3rd Annual Goose Greasers Model Airplane Club Control Line Jamboree for CLC, CLS, beauty and destruction derby. A. J. Kovelski, C.D., 331 Adams Ave., Scranton, Pa.

21—*Pittsfield, Mass.* Pending.

21—*Inglewood, Calif.* Class AA Skywolves' Combat Meet. Don C. Crystal, C.D., 805 E. Palmer Ave., Compton, Calif.

21—*Watertown, N. Y.* (AA) Flying Chips' Model Meet for FFG, TLG, CLS, CLC, RC, OHLG, CLFS and OR. Amos Harvey, C.D., R.D. 2, Marcy, N. Y.

22-26—*Sumter, S. C.* Air Force World Wide Model Airplane Championships. Restricted to qualified Air Force personnel.

(*Continued on page* 52)

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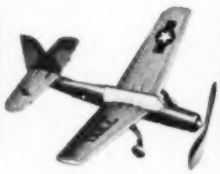

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28—*Fresno, Calif.* Fresno Gas Model Record Trails for FFG. Jim Scheidt, C.D., 2225 Brown, Fresno, Calif.

28—*White Plains, N. Y.* (AAA) Westchester Aviation Committee's Model Meet for CLC, CLS, OHLG, OR, FFG, PL, RC and CLFS. A. E. Lehmberg, C.D., North Salem Rd., Ridgefield, Conn.

29-Aug. 4—*Willow Grove, Pa.* (AAAA) 26th Annual National Model Airplane Championships. For info.: Academy of Model Aeronautics, 1025 Connecticut Ave., N. W., Washington 6, D. C.

AUGUST

10-11—*Omaha, Nebr.* Class AA Omahawks' Annual R/C Meet. Thomas B. Mossman, C.D., 1202 So. 72 St., Omaha 14, Nebr.

10-11—*Syracuse, N. Y.* Syracuse Sky Knights' 5th Get-Together. William E. Kenyon, R.D. #2, Manlius, N. Y. Pending.

11—*Santa Anita, Calif.* Team Race. Pending.

11—*DeKalb, Ill.* Class AA DeKalb Cloud Dusters' Flying Circus for FFG, OR, OHLG and RC. Dutch Hess and Dale Hindenburg, C.D.'s 137½ E. Lincoln, DeKalb, Ill.

11—*Tulsa, Okla.* Class AA Tulsa Glue Dobbers' U-Control Contest for CLC, RR, CLFS and NC. Stanley B. Childs, C.D., 6762 E. Haskell Pl., Tulsa, Okla.

11—*Frederick, Md.* Class AA Fourth Annual Model Meet for FFG, CL, CLS, CLC, TR and RC. Morris Rhian, C.D., 1515 Rosemont, Frederick, Md.

11—*Detroit, Mich.* Class AA Sky Guys' Annual Contest for FFG and OHLG. Restricted to residents of Mich. and Ont. Ernest Shailor, C.D., 12659 Mark Twain, Detroit, Mich.

11—*St. Louis, Mo.* Class AA Hazelwood Aero Modelers Association 1st Annual U-Control Meet for CLFS, CLS, RR, CLC and beginner's event. Walter A. Platte, C.D., 2127 67th St, St. Louis 20, Mo.

11—*Wilton, Conn.* RC Meet. For info.: Calvin Hanks, 36 North Fourth St., Ansonia, Conn. Pending.

11—*Fond du Lac, Wisc.* Class AA Fond du Lac Glo-Bugs Model Airplane Contest for CL, CLS, CLC and CLFS. B. A. Zuehlke, C.D., RR #3, Ellis, Fond du Lac, Wisc.

11—*Kokomo, Ind.* Class AAA North Central Indiana Control Line Championships for CLC, scale, CLS, CL, NC and trophy dashes. Joe Braum, C.D., 1603 Haynes Ave., Kokomo, Ind.

11—*Alliance, O.* Class AAA Alliance Exchange Club Model Contest for FFG, flying scale and RC. Edward Cross, C.D., 23 E. State St., Alliance, O.

11—*Baton Rouge, La.* Pending.

Designs for the new F.A.I. Rules

(*Continued from page* 29)

Only time will tell what the ultimate performances will be under the new rules. However, after some careful analysis, I think we may be pleasantly surprised. Since the Eliminations for selecting the 1958 Wakefield and Gas Teams will be held on August 18th, 1957, you'd better get a move on.

First, let's take a look at the FAI power event. The .15 engines have dominated this event for the past four years, because of the more favorable size to weight ratio this class allows. Things shouldn't change much for 1958, since the rules are even more in favor of the top displacement engines. For example, the minimum weight for a Half A model is 8.6 ounces. This isn't too bad, but the surface loading rule permits a combined area of only 190 sq. in., without increase in weight. Try handling a hot .049 on a 150 sq. in. wing! Figuring a wing of 200 sq. in. as the minimum, we come up with a combined area of around 265 sq. in. This means a weight of 12 ounces, not the best for top performance.

A quick check through the other engine displacements makes it obvious that the smaller engines are hopelessly outclassed. Using a .15 however, we are on safer ground. Minimum weight for this displacement is 26.5 ounces. This permits a wing and stab of 582 sq. in. without a weight penalty. With a 35% stabilizer, it works out to an approximate wing area of 450 sq. in. This seems to be a reasonable model judging from the 1956 models, excellent for the increased weight.

While this size model is large enough to handle a hot .15, the wing loading of more than six ounces per 100 sq. in. is approaching the limit for good glide performance. For this reason a larger model may prove popular in an effort to reduce sinking speed. A 600 sq. in. wing appears about the top limit for a hot .15, which would result in a combined area of around 800 sq. in. Still figuring on the surface loading total weight is around 36.4 ounces.

From these figures it is apparent that the model conforms quite closely with the top International PAA load designs. A good example is Woody Blanchard's International, now available in kit form from Berkeley. With a portion of the cargo removed, this ship is a natural for the new FAI rules.

However, by designing specifically for the event a potentially better model can be built. With another eight or more ounces to fool around with we can pay more attention to structural and aerodynamic refinements. Streamlining once again becomes a controversial point. Certain-

RUBBER TURNS TABLE

STRANDS	MOTOR LENGTH (NEW)	TURNS PER INCH	MAX. TURNS
10	29	26	720
12	24	24	540
14	20½	22	450
16	18	20	360

ly, a clean model has less drag than the "boxes," despite the contest results. Mike Gaster's Gastove is an example of this clean type, and one which has proven its superiority in competition. Increased use of sheet and hardwood should result in a more durable and rugged ship. Also, there is no reason for not using silk or light nylon on the flying surfaces.

The choice of powerplant is even more important than before. The Oliver Tiger Mark 111, Webra Mach 1, and possibly Roy Cox's new .15 should dominate this event. The shut-off problem has largely been solved, thanks to John Tatone and his "Tick-off" timer. A good reliable fuel system, coupled with the correct prop to deliver peak performance will be essential.

The elimination of take-off makes things a bit easier. Certainly, it eliminates all the problems of landing gear design, along with it's attendant drag. With no ground-loop problems, or worry about VTO in the wind, the models should last longer. Also gone, thank goodness, is the possible disqualification for an illegal launch, whatever that was.

The picture in Wakefield is not so promising, however. With only 22% of the total weight available for power, conditions are marginal. The only bright spot is the abolition of the take-off requirement. This accomplishes more than eliminating a few sticks and pins, as well as the classic "What do you mean I pushed?"

Many ships have washed out because of poor characteristics at launch. Yet, when hand launched, these same airplanes could turn in consistent maxes. One of Dick Baxter's main problems in developing his geared-up design was getting the thing off the ground. Once airborne, these ships had it made—but those first few seconds were brutal. Certainly, less power or larger props can be used to advantage now. This is the most important factor in the new designs; trying to determine optimum prop and power combinations.

With reduced power, the idea of a smaller model comes to mind. By designing to the 263.5 sq. in. minimum area we can knock about 25 sq. in. off the wing. The increased loading shouldn't affect the glide too much, and the model will surely climb faster. Again the height of pylons can be reduced, as well as less area in the stab.

Since the power plays such an important part in the design, this must be our starting place. A turns chart is included to assist in determining motor lengths and possible winds. Proper technique in prewinding and care of the rubber is now more important than ever before. Also, the motor must be wound very close to maximum turns to gain every possible advantage.

The general layout of the model should not change greatly, except for shorter fuselages. With the weight of the motor concentrated in the forward portion of the fuselage, we can move the wing forward. This will result in a more stable machine, which will be capable of tighter turns in windy conditions. With a motor base of approx 24 inches over all, length need not exceed 40 inches for normal tail-moment arms.

The one point where most improvement can be made is in the propeller assembly. An absolutely true shaft is a necessity, as well as rigid hinges and accurate blades. It is feasible to use ball bearings for the shaft to run in, as well as increasing the prop shaft diameter. At present we are experimenting with a ⅜ dia. shaft with full ball bearings, and an in-

ternal tensioner-stop arrangement. Complete weight of propeller and a maple nose block is 1.2 ounces. Some may scoff at the idea of going to these extremes, but with such limited power available we must make every effort to use it efficiently.

With another ounce of structure to play with we can build a really strong fuselage. A sheet box covered with nylon will stand up under almost anything, including broken motors. Wing and tail assemblies should not become heavier, due to undesirable high inertial moments. However, warp resistant structure should become more popular with a little increase in weight. Mechanical timers for dethermalizers will also appear, further increasing reliability.

As with the power event, streamlining becomes practical. Semi-scale ships, such as Frank Zaic's New Yorker, detailed in the 1953 year book, will show to advantage. Careful attention to wing mounts and fittings will help to clean up the ship.

A word about rubber: Pirelli has proved its superiority for contest flying in international meets during the past ten years until its use is almost universal. Also, be prepared to use a different motor on each official flight. Winding to maximum fatigues rubber very quickly, and a "dead" motor is fatal. Breakage will become a problem and consideration should be given to easy replacement of a broken motor.

Performance is still a question. Initial tests with last year's ships ballasted and flown on 50 grams indicate that three minutes is possible under dead air conditions. However, there is little reserve power available, so time in windy conditions will be lower. It is still possible to get five maxes. It just takes more effort.

Engine Reviews

(*Continued from page* 34)

in tension. The overall effect of this is that all the parts deflect slightly, and the head being attached to the cylinder by screws disposed outside the cylinder walls, bulges and tries to dish the top cylinder flange inwards. This in turn causes a contraction of the cylinder bore, which grips the piston, and an appreciable amount of friction is set up.

This is a handicap common to engines of all sizes and is partly responsible for the well-known wear pattern which tapers to a maximum at the top of the bore. It is a fault difficult to remedy because if a suitable taper is machined into the bore so that there is no bind under combustion pressures, there will be compression loss under the relatively low pressures existing before firing occurs. Rigidity is therefore the best solution, with design which carries the effect of head strain away from the bore.

An engine having this fault, which includes the majority of model engines, will obviously require a prolonged break-in time to wear this tightness out of piston and bore, and when it does it may have very poor compression at cranking speed and yet have more zip than ever before. Most of us have had engines which go like a bomb on time borrowed from the scrapheap, and have heard the opinion that compression is an unnecessary convention.

It is difficult, as with most transient conditions in engines, to tell whether, and to what degree this is happening. It was measured on the Fox by boring a bore

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sized hole in a cylinder head, and inserting an air gauge which registered the bore sizes as the cylinder head hold down screws were tightened. This revealed a built-in bind additional to the friction appearing during operation, and was probably even greater than shown by the air gauge when a complete head was installed. Obviously the relief of this malady should show worthwhile gains, and has contributed to a quite remarkable improvement in experimental engines. The Fox .25 embodies the remedy in the form of cylinder head retaining screw bosses which extend from the top flange of the main casting right down to the bypass and exhaust belt. The screw tappings are deeper than before and longer screws used. The stress is therefore transmitted away from the top of the bore and distributed axially along its length. The bosses in conjunction with the cylinder cooling fins greatly increase the rigidity of the whole casting.

Main bearings and bushing materials have also come under review. The importance of keeping friction to a minimum becomes acute as shaft diameters and rubbing speeds increase, and since it has always been a characteristic of Fox engines to have the smallest diameter crankpin equal to the task in order to minimize friction, it is not surprising that the large mainshafts dictated by rigidity and gas passage requirements should give rise to close scrutiny of bearing materials. Apparently aircraft quality cast bronze has been found to combine lowest friction with greatest resistance to pounding in the Fox application and is incorporated in the .25 with a 7/16" diameter mainshaft. This permits the use of a 5/16" diameter gas passage with lots of beef remaining, and, in conjunction with a cleverly cut valve port, results in a very strong shaft. This valve port, measuring 9/32 by 5/16 is cut by first milling a flat in the shaft that is slightly wider than the finished port, and then broaching out a hole in the flat into the gas passage. This method produces no sharp corners and edges on the shaft surface from which cracks can originate, and provides a large port with the least weakness. The use of a ground crankpin has necessitated changes to the counterweight to allow the grinding wheel full traverse along the pin. The crank web is now 3/16" thick all over, but neatly milled away on either side of the pin so that the mass remaining counterbalances all rotating weight and about one-third of the reciprocating weight. A four-groove splined drive and 1/4 thread completes a very attractive crankshaft.

A material which seems especially successful for cylinder liners is the leaded steel used in the Fox range together with iron pistons. This combination feels right, and when worked together dry quickly produces its own lubrication. It is claimed to be proof against seizure on the hottest fuels and under no circumstances of reasonable treatment does the engine sag because of heat. The use of thin walls on both piston and liner is doubtless made possible by these materials, together with the improved casting design.

A long intake, provided with a removable ¼" bore restrictor, is equipped with registers for two spraybar assemblies for modification to two-speed operation, and for those wanting the ultimate in power a boss is provided in the rear cover which may be tapped out to take the 29R pressure feed valve assembly.

The conrod follows the usual current Fox design with 3/16" big end, and 5/32" small end embracing a ground tubular wrist pin with brass end pads. The fit on the crankpin is extremely good.

The cylinder head employs the recessed blowout proof sealing system developed by Fox, and which seems to be the complete answer.

We have praised the needle valve design before in these columns and while it is foolhardy to state that anything is beyond improvement, it is safe to say that we are not a bit surprised to see that this component has remained unchanged for a considerable time.

FROM A MODELER'S NOTEBOOK:

New Planes, Prizes and Pilot Awards Make More Flying Fun.

BY CARL GOLDBERG

NEW FREE FLIGHT—
THE ½A BLAZER

Pleased as punch to date with performance of ½A Blazer. It has lived up to all my expectations . . . the unusually thin wing gives blazing climb, flat glide . . . beautiful soaring flights . . . it's difficult to describe your feelings as you see it spiraling up there. Sure ought to win its share of contests. All die-cut balsa parts, step-by-step illustrated full-size plans. 40" span, designed for .049 engines. The Blazer is on your dealer's shelf now . . . and it's only $2.50.

HI FELLOWS — There are many new notes and a hot new contest idea (see below) in my notebook this spring and I thought you would be interested in some of them. It's really great to see that more and more modelers are getting the thrill of flying as well as building. There's nothing quite like watching that plane taking shape step by step, and looking ahead to the excitement of flying it!

INCIDENTALLY, I'VE BEEN GETTING applications from all over the country for that Model Pilot's Certificate we offer (details on the $1 kit plan too). You just beat the time specified on the plan, using one of my kits. First application came from Texas, within a few days after the kits went on sale.

THIS IS THE RANGER 28, my new semi-duration model. It's easily capable of flights of up to a minute, and can often do much more. A larger, lighter version of the Ranger 21. It's really something new — prefab plus paper! You'll be surprised at how easy it is to build. Big 7" plastic prop, all interlocking die-cut balsa parts, two colors of tissue, formed landing gear, decals, etc., and a long powerful rubber motor to make a wonderful 28" span long-flying model. Full size plans, too, with step-by-step instructions. People raise their eyebrows when I tell them you can buy it at your dealer's for $1.

HERE'S A PIC OF my new Cessna 180. I think you'll agree it's an all-balsa beauty, even if I do say so myself. 21"wingspan with fine, stable flight characteristics. This is the "champion of business-liners!" Everything's in the kit to make this simplified flying model that looks like the real job — all die-cut balsa parts, formed landing gear, 11" rubber motor, big decal sheet, die-cut windshield, 5" plastic prop, nose spinner, etc. Your dealer has it now, and the price is $1.

AND HERE'S THE SHOT of our very popular Shoestring Racer. Your response has been terrific, so I'm continuing to ship them out. With 18" wingspan and all the parts and trimmings in the kit, you seem to think it's a good flying buy at $1. And that's just what your dealer is asking for it. As a flyer, this ship is pretty close to the Ranger 21.

BY NOW SOME OF YOU may have seen the movie "Spirit of St. Louis" with James Stewart. Isn't it a thrilling film! Your dealer has my model kit — the only all-balsa rubber-powered flying model — of the plane Lindy flew. They're $1, too. 21" wingspan, all die-cut balsa parts, in fact everything needed to make a miniature duplicate of the ship that gave the world its greatest flying thrill! Best time with this model so far is by Gerald Elliott of Grosse Point, Mich. — 1 min. 13 sec. — sanded very light.

I'VE PUT A PICTURE below of the Ranger 21 that a great many of you like. Dealers have sent in many re-orders on this one so I know it has your approval, It's nice to know that I designed one that you like so well. To repeat our claim — it's the best flyer in its class! 21" wingspan and complete at $1 too.

NOW HERE'S THE BIG NEWS I have for you. To help increase your flying fun, I'm going to make the following offer, good until Sept. 30, 1957. Get up a simple flying contest with your friends, (or perhaps your Scoutmaster will run it) with 50c each as an entry fee, to be used for prizes. Make it a contest for Carl Goldberg $1 models. Collect all the kit boxes for the planes in the contest. Then just cut out and send me the names of the planes, from the front of each box, plus the entry fee money, and I'll promptly send you planes, engines, etc., that you pick from the list below to be used as your contest prizes:

- 3 names plus $1.50 for ½A Blazer, a $2.50 value.
- 5 names plus $2.50 for ½A engine, a $3.95 value.
- 8 names plus $4.00 for Blazer and engine, a $6.45 value.
- 12 names plus $6.00 for wrist watch, a $9.95 value.
- 20 names plus $10.00 for camera or electric drill, a $19.95 value.

Here is how you might run the contest. Hold it in a park or large school playground. Time the models with a stopwatch or sweep second watch. Give everybody five flights, longest flight wins. I suggest you cut the time of the Ranger 28 in half, so as to give the other ships a fair chance.

And listen to this — the one who sends in the most Carl Goldberg plane name cut-outs for the above prizes by Sept. 30, 1957, will receive in addition FREE a genuine $59.50 Transistor Portable Radio as a grand prize token of my appreciation.

Tell your dealer about it, too. He can tell other fellows about your contest, and the more entries the more prizes. So what do you say — let's build those planes and LET'S GET FLYING!

Carl Goldberg

P.S. The easiest way to get these planes, of course, is to see your dealer. If no dealer near you, or he doesn't have them, send me cost of plane plus 25c each for postage and packaging. Better yet, send cost of any three and I'll pay the postage!

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Performance and Handling

We often see and hear comments upon the fuel lift capabilities of engines and it is generally understood that a high lift denotes suitability for aerobatics and promise of smooth performance. This is not necessarily the case. It is simple to make any engine lift fuel two feet or so by progressively opening the needle valve as the fuel tank is lowered. The limiting factor is usually the jet size. The engine cannot be started by hand with high lifts, and its ability to perform this feat is no indication of what it will do with a fixed needle setting in the air. Lift can obviously be increased by restricting the intake, and this can be carried to the point where the engine has very little power but makes a highly efficient fuel pump. Similarly valve timing can be retarded to increase lift. However, the hard facts of the matter are that fuel suction is inversely proportional to engine power because to gain fuel you have to restrict the admission of air, therefore one cannot have exceptional power with phenomenal lift at the same time. Further, what good does high lift do when you have got it? There is only one fuel air ratio on which an engine will give its maximum, and any alteration of fuel level alters this ratio and hence reduces power. Raise the fuel level and the engine runs rich, lower it and she runs lean, and the spread of mixture tolerance for maximum power has very little to do with the engine, but depends almost entirely on the fuel. Alcohol is far less fussy than gasoline, for instance, and is the main reason for the smoother operation of glow motors in stunt jobs compared with spark ignition. Fuel lift variation figures would therefore be of very real interest if applied to fuels tested in an engine with a fixed maximum power needle setting, but give no real clue to the value of an engine unless reviewed in the light of all other pertinent data. A formula could be developed to include all this data and produce an overall efficiency factor for engines, but unless all engines are designed to do the same work, it would only mislead. The issue is quite simple as far as the assessing of engine suitability is concerned. High power at high R.P.M. means susceptibility to sagging in violent maneuvers. High power at medium R.P.M. as typified by Fox stunt engines promises the best compromise between power and flexibility, especially where the intake is three or four times as long as its bore, and moderate power at low R.P.M. usually gives very high lift but an engine that is very sensitive to changes of attitude and mixture strength, and it is this type which tends to die just when you are pleading for power, yet it has the greatest lift of them all.

All the Fox stunt engines give their maximum power between 10,000 and 12,000 R.P.M. for the above reasons, and that is one of the main factors behind their success. The best engine in any branch of contest work is invariably the best made best specialized compromise. No engine can be that in all branches.

Getting back to the case in point, we can afford space for the above digression simply because, to cover the handling and operation of the .25, we have only to say that it behaves like a Fox.

Test

Plug—O.K. Long Reach.

(*Continued on page* 58)

Running Time Prior to Test—1 hour.
Bore—.738 Stroke—.600 Weight—4¼ ozs.

Power Prop	*R.P.M.*
10 x 6	12,000
9 x 6	12,800
7 x 10½	13,500
7 x 9	14,200
7 x 8	14,600
Top Flite	
10 x 6	11,100
9 x 8	11,300
9x 6	12,100
8 x 8	12,250
8 x 6	12,800

Czepa on Airfoils

(*Continued from page* 17)

than the pressure on the bottom. If this is so, we need only to curve the wing a lot and we have an ideal airfoil. Unfortunately, there is also a limit here. The more the airfoil is curved, given a certain incidence angle and airfoil speed, the less smoothly will be the flow around it, with the expected increase in drag once again. The problem therefore becomes; how can one achieve smooth airflow around an airfoil with maximum curvature?

This brings us to one of the mis-discussed phenomena in modern aeromodelling—the boundary layer. Professor Ludwig Prandtl discovered in Germany in 1904 the existence of a thin layer of air immediately upon the wing's upper surface. This layer is between the wing and the mass of air flowing over it. It consists of those air molecules which stick to the wing and those whose flow is slowed by cohesion. Above this boundry layer the mass of air flows smoothly over the wing. Professor Prandtl indicated in 1914 that this boundary layer may be laminar (smoothly flowing) or turbulent. At slow speeds, the boundary layer is laminar but it does not have sufficient energy to penetrate the high pressure at the maximum point on the airfoil's upper surface. As speed of airflow increases, however, the boundary layer remains laminar up to a critical point, after which it becomes turbulent.

Turbulence means no more or no less than that the molecules of the laminar flow which would stop, move out of the boundary layer into rapidly moving airstream above, gain energy, and move again back into the boundary layer. This movement up and down in waves is the turbulence. The laminar flow is what is internationally termed "undercritical", while the turbulent flow is called "over-critical". This turbulence may be artificially induced. Note, in illustration II the difference between the upper and lower surfaces of a streamlined object. Below, the laminar flow breaks away at the highest point, but on the upper surface, the addition of a wire induces turbulence which brings the airflow back to the surface of the object. This has great meaning for the performance of models, because of the drag decreases, and this change from laminar to turbulent airflow is a sudden one which occurs particulary in the speed ranges at which our models fly. From Professor Schmitz, famous director of the Goettingen Institute for Model Aeronautics, comes experimental evidence that the change from laminar to turbulent flow on the wing's upper surface reduces drag one third and doubles the lift obtained. This means that the lift-drag ratio of the model is three times as advantageous!

Hence, the important question becomes: what conditions must be fulfilled in order to attain "overcritical" or turbulent flow flight?" Our first thought is to increase flight speed. This is achieved with a

(*Continued on page* 60)

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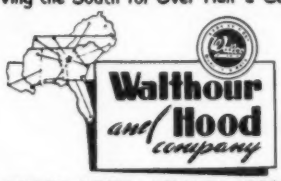

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higher wing loading, but since we are only interested in sinking speed, this path is inadvisable.

Experimental measurements have shown that the overcritical state may also be achieved by increasing the chord of the wing. (This is Reynold's "rule of similarities"). This method, a decrease in aspect ratio, would be preferable to increasing forward speed, but tests showed the price paid for increasing wing chord. With a decrease in aspect ratio, the induced drag of the wing tip is substantially increased, again resulting in loss of lift.

Illustration III shows the action of a turbulator placed in front of the wing's leading edge. Illustration IV shows the action of a turbulator on the wing's upper surface. Illustration V indicates what happens when a guide vane is placed above the wing. All of these methods have as their goal one result—holding the boundary layer close to the upper surface of the wing and all of these means, however, require the most exact placement of the turbulator or guide vane, which can only be achieved by long, exacting experiments for each particular airfoil. The most ideal method to draw the boundary layer close would be to suck it to the wing from within. The invention of a successful means of doing this would bring an unbelievable increase in model performance.

The simplest method is to use a relatively sharp leading edge on the airfoil. This takes over the job of the turbulator, Diag. VI. With increasing incidence the stagnation point moves downward to the lower surface of the airfoil. The boundary layer which flows upward from the stagnation point gathers a centrifugal acceleration through which a circular wake is formed which makes the boundary layer turbulent. With increased incidence or a sharper nose, an effective turbulence is achieved but, unfortunately, also an earlier separation of the airflow from the top of wing. One does not dare to forget the thickness of the particular airfoil in choosing his means of turbulation. The flatter and thinner an airfoil is, the easier it is to achieve turbulence at lower speeds, because the transition from laminar to turbulent boundary layer at lower speeds can be achieved only through thin airfoils and smaller nose radii. Therefore, the smaller the model, the thinner the airfoil should be.

It is possible, following the above discussion of the factors necessary for a good choice of airfoil to summarize. The following should be kept in mind:

1. The airfoil should have the maximum camber possible with the incidence angle optimum for its particular shape in order to achieve smooth airflow on the wing's upper surface. This enables the model to fly with the least drag and the most lift.
2. Artificial turbulence can be used where advantageous.
3. With airfoils in which no artificial turbulator is used, one must use a relatively sharp leading edge, and less airfoil thickness. This enables such an airfoil to attain the overcritical state as if one had used artificial turbulence.

In the next article, we will study the choice or actual layout of airfoils for desired performance requirements and various weather conditions.

Next Month
FOKKER TRIPLANE
Joe Nieto Plans

Radio Control News

(*Continued from page 22*)

cells. In time, it may be expected that the power output will be increased and then the battery could be built right into the receiver, since it would probably last the life of the set.

A word of caution to those who build their own transmitters, and especially to those who design their own. The use of a crystal does not guarantee that the output frequency is correct. Improperly designed tank circuits can give an indication of being properly tuned, when actually the output frequency may be the 5th instead of the normal 3rd harmonic. Correct frequency is best determined by a grid dip meter. If you do not have one, a #47 flashlight bulb and several turns of wire (¾" loop) will give a good indication. Using 135v, and drawing about 10 ma or more on the lowest dip, will give fair brilliance to the bulb, if the 3rd harmonic of the crystal is tuned in. The 5th harmonic may indicate a meter dip, but the bulb will not glow. If you have access to a "ham" receiver, it may be used to check your frequency. Even though a meter dip is correct and the bulb glows to a fair degree, it is still possible to be a megacycle or more off to the 27.255mc spot.

CLUB NEWS

For the benefit of those of you who do not get a copy of some of the club papers published around the country, we'll present a few highlights from some of them. The Modulator, house organ of the Pioneer Radio Controllers, of Calif., comes news of a worthy enterprise. Mr. Jim Doherty has donated a trophy to be presented to the person making the greatest achievement in the field of RC during the fiscal years of '57 and '58. This should stimulate interest and provide food for thought for other clubs and groups throughout the country. Here a few more interesting items from The Modulator. Bob Leininger washed out a multi-channel job. Don't know how he did it, but one week later Bob had a rebuilt and repaired ship back in the air. Alex Schneider did a rebuilding job on his plane after it landed in some high grass—which camouflaged a stack of cement blocks. Anyone for radar? Gordon Shepard ran into some bad luck which was traced to an open connection inside the B batteries. Past columns have mentioned several instances like this and we suggest you read Technical Topics this month on the same subject.

Further down the west coast, the LARKS of Los Angeles are still flying merrily along. At a meet, around the first of April, Bob Dunham took first in multi-channel with 279 points, using Orbit eight-channel simultaneous gear; Joe Murphy was first in Mickey Mouse (171 pts.), using the new CG single-channel transistorized receiver; and Bill Williams took first in rudder only with 165 points, using a Deltron single-channel radio.

Incidentally, time and experience pay off, inasmuch as Bob Guhl Sr. with 27 points in Mickey Mouse beat out Bob Guhl, Jr. with 6 points. Quite a bit of RC sailplane work going on in the LARKS nest, with the old familiar Thermic 100 leading the pack. Someone is building a Great Lakes Trainer which will use the Orbit eight-channel system. The old timers should remember the Great Lakes as one of the most popular scale biplanes for rubber-powered work. Bill Butler is having excellent results with his Les Wright receiver and Relaytor which was written up in our May column. The amazing thing about this sytem is the price of $29.95 for both units. This may be the answer for

some of those planned endurance flights. In closing, we'd like to challenge any other RC group in the country to match the membership of 120 plus members claimed by the LARKS.

The Kansas City Radio Control Association, 5725 Prospect Ave., Kansas City, Mo., announces the change of date for their annual RC contest. The new date is July 13th and 14th, instead of a week earlier. Judging from past activity in that area, this should be a good contest for all RC'ers in that part of the country.

The Syracuse Sky-Knights Hobo-get-together is scheduled to be held on August 10th and 11th, this year. This is a dawn to dark affair, with no holds barred. We fail to see how you could miss having fun on the new 85-acre field, located 12 miles south of Syracuse, in the heart of the rolling countryside of western New York. The Sky Knights are an active group, composed of many old timers in the model field so you should get something out of it just watching them operate. Remember, August 10th and 11th, 1½ miles north of the main route, Rt. 20, and 12 miles south of Syracuse on Rt. 80. All are welcome and we'll give a report on this event later on.

Many RC fans have probably thought we were trying to fill up space during the past year when we kept requesting that FCC registrations be filed on 27 and 465mc transmitters. This was not idle chatter and there may be many who will wish that every RC model transmitter was on file with the FCC. As many of you know, large metropolitan areas have adopted radio control for traffic lights. The equipment used for this operates on 27.255 mc, with transmitting power as high as 500 watts. Needless to say, this power can often over-ride your one to five watter. What can be done about this situation, you ask? It might be well to follow the example set by City of Los Angeles. Mr. Ken Willard, 6546 Orion Avenue, Van Nuys, Calif., advises that a fairly satisfactory solution has been arrived at in this manner. Each Friday, Ken calls his Department of Traffic for the schedule of transmissions for the following Saturday and Sunday. This information is disseminated to key points for the benefit of the RC flier. There has been talk of moving the city operated frequency to 40.68mc.

Incidentally, many people do not know of the widespread use of 27.255mc for model work; it will be up to you to educate them. As far as interference is concerned, the cities may have their problems too. The city of Evansville was affected by the transmissions from Los Angeles, half way across the country. We're quite sure that if the FCC was fully aware of the number of RC model users, something could be done. The only way they can officially know, is by the number of registrations on file. SEND YOURS IN TODAY.

The San Leandro Channel Masters have a club newspaper known as "Channel Chatter" published at 3334 Costa Drive, Hayward, Calif. Interesting items gleaned from the April issue are: Jerry Nelson has been doing some endurance flying of a type known as ridge soaring. Best time to date was 53 minutes, including loops without loss of altitude. Secret is to pick a hill with the wind blowing in toward it. Keep the model in front of the hill and make all turns away from the hill. This set-up is ideal on the west coast; however, it can also be done in the east. All you need is a hill or a ridge, a wind or strong breeze, and you have a built-in brute-force thermal.

For fear of being accused of favoring the west coast RC boys, we'll look in on the DCRC group.

This club has investigated the use of braided silk suture material for control lines used on rudders, elevators, etc. This material is extremely flexible and has practically no stretch. Known as Ethicon, it is available at most medical supply houses. Henri H. Hoge, 2209 Crest Road, Baltimore; and Bill Holman have a circuit in the April issue of the DCRC Newsletter which is the first step to the ultimate in servo control. While still in the development stage, this circuit will eventually give true servo control without the use of relays. Transistor circuitry will drive the electric motor, which at present is a Mighty Midget.

Last minute information from the East Bay Radio Controllers of Oakland, Calif., outlines their requirements for the RC speed event. Maximum weight of ship is 11 pounds, flying weight (imagine the impact at about 120mph), maximum engine displacement of .65 cu. in. and maximum wing area of 2,320 sq. in. The model must have an enclosed fuselage, take-off unassisted and fly a 500-foot course. The return trip must be made within ten minutes, with no landing between first and second speed run. The recommended course shall be at least 75 feet wide and two timers and flagman, stationed at each end of the course, are used. Speed is calculated by taking the sum of the first and second speed run and dividing it into 682. This will give MPH. If this sort of thing grows in popularity, we'll soon have electronic timing devices. It would be a simple thing to do if the model could be controlled to fly between two poles, or at an altitude confined to plus or minus 50 feet. Who's next around the country?

We thought we'd start off new items this month with something for those who have everything. Electric Controls, Inc., Wales, Wis. has a GenerAC, a unit that will supply 3,500 watts of 110v ac power from your car. The GenerAC is fastened near the front of the motor, to take advantage of the fan and generator pulleys. Less than 10-in. diameter, this unit sells for $275.00 and could possibly be just what your club is looking for. You could run every soldering iron, transmitter or PA system at a large get-together from this power source.

Here is some good news on relays. The Sigma 11F, 6,000-ohm model, now sells for only $1.70, with the 9,000-ohm model at $1.85. The 11F relay weighs 1¾ ounce and the 6,000-ohm unit pulls in at 2.9ma and the 9,000-ohm unit at 2.4ma. These are perfect for secondary relays in boat or plane installations. The familiar 4F sells for $6.00 and replaceable coil-frame assemblies may be had for $1.75. For those requiring the ultimate in sensitivity for model RC use, the model 26F sells for $8.50. This model will pull-on at from .5 to .7ma and will drop-out at a difference of but .1 to .2ma.

The Berkeley Super Aerotrol Escapement and the Super Aerotrol Compound Escapement have been out for quite some time. However, after the initial sales surge when they first came out, we haven't heard too much of them. This column makes periodic checks on all items mentioned, and it was during this check that we discovered other features of these escapements. First of all, the current drain is exceptionally low, being but 150ma on 3v, thus the coil resistance is 20 ohms. The Super Aerotrol Escapement, model DE-205, selling for $3.95, is one of the few escapements that will give real power for operating motor controls and auxiliary devices such as flaps, parachute controls, etc.

BRAMCO Products announces, through Kay Specialties, Box 5197, Grosse Pointe

Mich. a new throttle for engine speed control. This $4.95 item is similar to their other famous throttle, except that the new one will fit a broader range of engines. Used on .15 to .60 engines, this throttle varies the fuel mixture and therefore does not load up the engine. It provides for a fully variable speed range, including cut-off. It may be operated with a servo or an escapement. Just the thing to produce those touch-and-go landings. Also from BRAMCO is the Cardinal receiver, a single-channel tone job which we mentioned in previous columns. The main feature of this 4½ ounce unit is the idling current of ⅓ma and the signal on current of 5ma using 45v and 8ma using 67½v. Their Regent '8' multi-channel receiver has a filament drain of but 10ma and idle current of ⅓ma, going to 10ma on signal, with one reed. For simultaneous control, 3 reeds can be made to operate at one time and the reeds can be pulsed fast enough to make a Mighty Midget motor stand still in any position.

ESSCO RC Products, 58 Walker Street, New York 13, N.Y., has a few new items that should be of interest to all RC fans. Now that tone receivers are gaining in popularity, tuning can be accomplished by means of a headphone instead of a meter. A single headphone for this purpose may be had for $1.95. Many builders use headphones for tuning carrier operated receivers also. A new battery charger is also available at a cost of $6.95. This unit, model BC-3B, will recharge anything from a 2v Magna Lux cell to the regular 6v NT-6 battery. This charger may also be set to enable you to recharge a 2v cell from your automobile battery. In the transmitter line, ESSCO has a new hand-held version of their MAC II unit. Five watts of power is fed into this circuit which is housed in a 4 x 3 x 6" box. For $21.95 you have the hand-held unit which can later be converted to a ground model, using a built-in 2v wet cell and power pack. Those of you looking for a reliable power pack, which will deliver up to 180 volts at about 40ma, can get the new voltage-regulated model (VS 1B), ready built, for $14.95, or in kit form for $10.95 (model VSO2B). The newest item from ESSCO is their Twin Hard-Tube Receiver, claimed to be super reliable. We have not checked one at the time this was written. However, the manufacturer is so sure of himself that not only does he refund your purchase price if the set does not meet the claims for it, but he gives you a dollar for your trouble of trying it. Some of the feaures are: a .3ma idling current; a relay current rise from near zero to as much as 6ma, long-life hard tubes and freedom from short-time adjustments. No kits are available as yet. The finished prices range from $14.95 to $21.95. Model Standard A uses two 1AG4 tubes, a Gem relay, and operates on 30v B supply. Model Special A uses two hard tubes, an Advance SO relay and operates from a 45v supply, giving a 6ma rise. Both sets are $21.95. The $14.95 model uses a les expensive relay and is built to sell at this price for those desiring an inexpensive set.

The new Ace Radio Control catalog, #57-4, is out in its new large form with high quality printing and plenty of photographs. This is a gold mine for those looking for those hard-to-get parts. One of the new items is a record (45 rpm) that will help you learn the code so that you can pass the test for a 'ham' license. If you have a Technician's license you can operate in the 50-54mc band.

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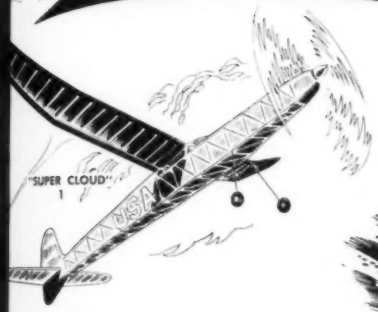
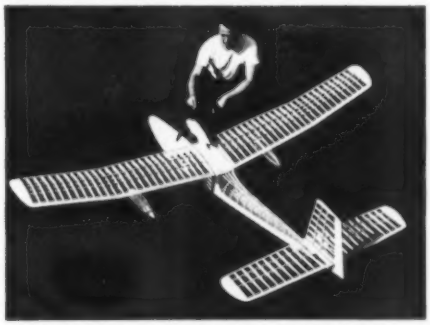
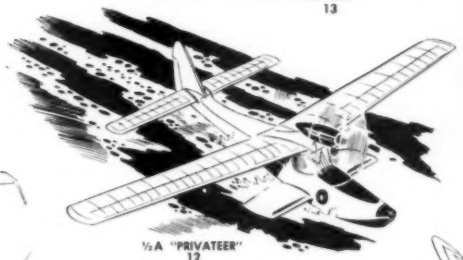
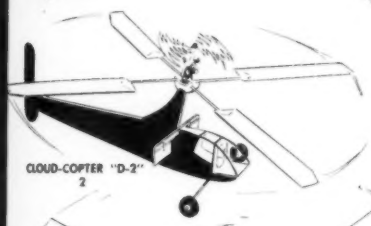
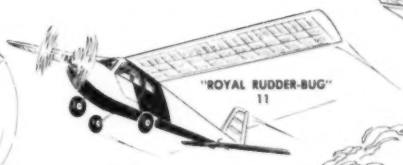


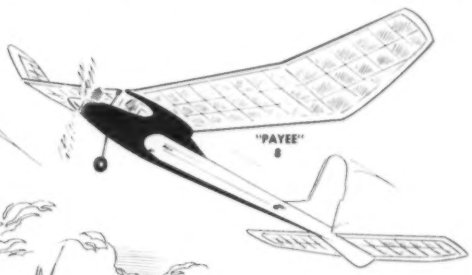


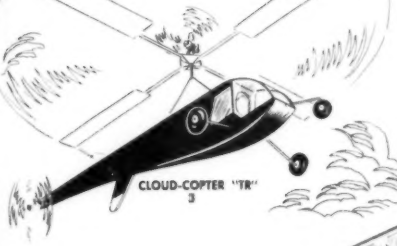
The thoroughness and attention to structural detail with which these models are designed, is illustrated by photo of mammoth "Custom Privateer" R.C. Amphibian.

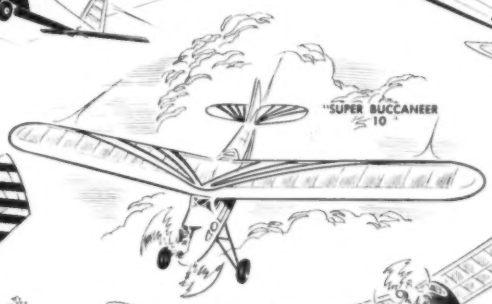


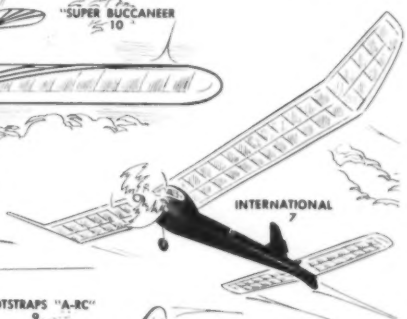


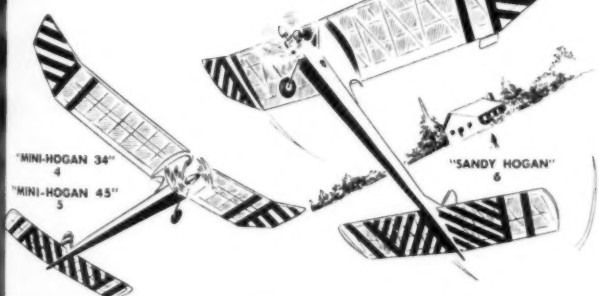












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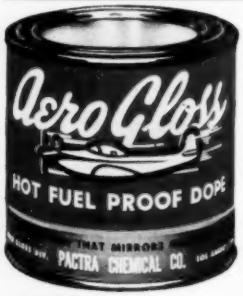

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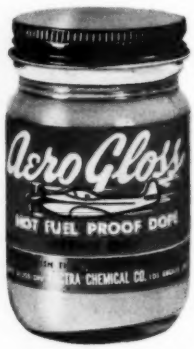

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